

32185/32186/32192/32195/32196 Group

Starter Kit User's Manual

M3A-2154G52B

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# Preface

Thank you very much for purchasing the 32185/32186/32192/32195/32196 Group Starter Kits, the M3A-2154G52B.

This manual describes how to set up the hardware and software products included with the 32185/32186/32192/32195/32196 Group Starter Kit and the precautions to be observed when using those products.

For details about the 32192/321296 or 32186 Group hardware and software products and development support tools, refer to the user's manuals and related documentation supplied with them.

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# 32185/32186/32192/32195/32196 Group

## Starter Kit User's Manual M3A-2154G52B

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### 1. Overview

#### 1.1 Outline of the Starter Kit

The M3A-2154G52B Starter Kit consists of M3A-2154G02A (32185/32186/32192/32195/32196 Group Evaluation Board; hereafter called the M3A-2154 Evaluation Board), M3T-PD32RM (Emulator Debugger for M32100T-EZ-E) and M3T-CC32R (Cross Tool Kit for the M32R Family; trial version).

This is an evaluation kit designed specifically for evaluating your computer at the early stage of system development as well as developing application software for the 32185/32186/32192/32195/32196 Group by using M32100T-EZ-E (Emulator for M32R).

M32100T-EZ-E should separately be prepared by the user.

It is capable of reprogramming internal flash memory of the 32185/32186/32192/32195/32196 Group microcomputer as well as controlling. Included M32100T-EZ-E and M3T-PD32RM enable fast reprogramming MCU's internal flash memory.

The following explains each item that constitutes the kits.

(1) M3A-2154G02A (M3A-2154 Evaluation Board)

The M3A-2154 Evaluation Board contains one of the 32185/32186/32192/32195/32196 Group microcomputer of 32-bit and single-chip RISC with a socket, allowing you to evaluate a microcomputer using the M32R core, internal memory, and peripheral I/O functions.

(2) M3T-CC32R (Cross Tool Kit)

The M3T-CC32R Cross Tool Kit, designed for use in developing application programs for the M32R Family microcomputers, has abundant functions suitable for developing embedded control systems using the M32R Family microcomputers. Included in the Starter Kit is a trial version of it whose useful period is limited.

(3) M3T-PD32RM (Emulator Debugger)

M3T-PD32RM, the debugger software for the Starter Kit, enables debugging the application system from the host PC by controlling the microcomputer on the M3A-2154 Evaluation Board which is connected to the host PC via the M32100T-EZ-E emulator. You can analyze the operation of a program available in load module form by using the M3T-CC32R Cross Tool Kit described earlier. This debugger provides a man-machine interactive debugging environment based on mouse manipulation by using a multi-window, graphical user interface comprised of easy to use menus and multiple debugger windows and dialog boxes.

(Reference)

M32100T-EZ-E (Emulator for M32R)

The M32100T-EZ-E Emulator connects the host PC's USB port and the M3A-2154 Evaluation Board's JTAG pin together, for controlling input/output between M3T-PD32RM and the M3A-2154 Evaluation Boards

## 1.2 System Configuration

Figure 1.1 and Figure 1.2 below show system configurations of M3A-2154G52B connected to an included emulator, and M3A-2154G02A by itself, respectively.

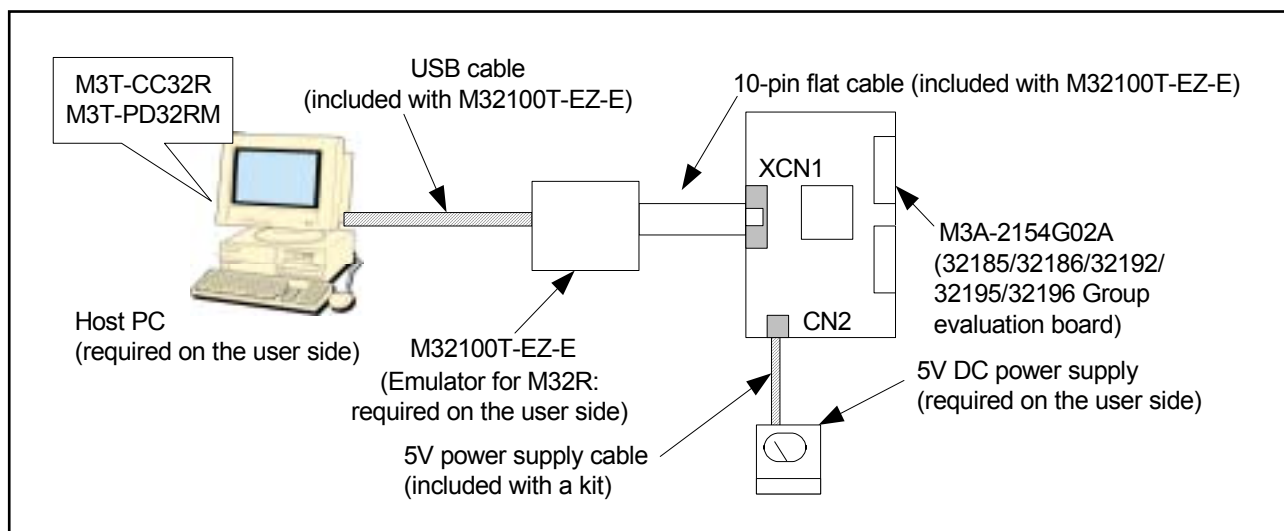


Figure 1.1 System Configuration of M3A-2154G52B Connected to an Included Emulator

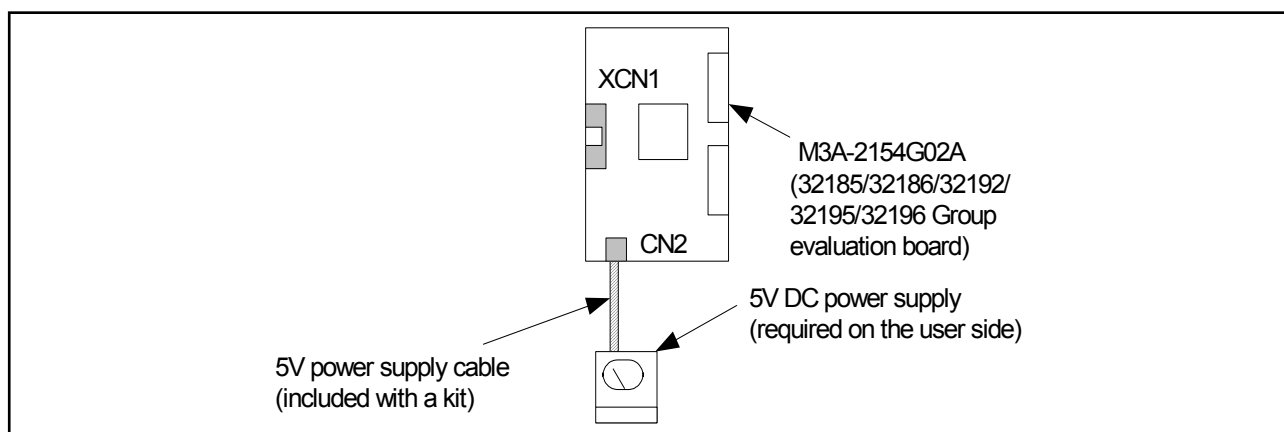


Figure 1.2 System Configuration of M3A-2154G02A by Itself



## 2. Contents of the Product Package

This chapter shows the contents of the Starter Kit product package. When unpacking, check to see that all items are included with your package.

### 2.1 Packaged Product Items

Table 2.1 shows the contents of the Starter Kit product package.

Table 2.1 Packaged Contents of 32185/32186/32192/32195/32196 Group Starter Kit

Packaged product name	Outline of product	Quantity
M3A-2154G02A	32185/32186/32192/32195/32196 Group Evaluation Board (hereafter called the M3A-2154 Evaluation Board)	1 pc.
M32186F8VFP	32186 Group microcomputer	1 pc.
5V power supply cable	Used for the M3A-2154 Evaluation Board	1 pc.
CAN cable	CAN cable	2 pc.
CD-ROM	Contained documents and software	1 pc.
M32R/ECU Starter Kit release note	M3A-2154G52B release notes	1 copy
IMPORTANT-READ ME FIRST	Written contract	1 copy

Note: When you unpack the Starter Kit, check to see that none of the above package contents is damaged or missing.  
If any item is damaged or not included, return the package to Renesas Technology Corporation through distributors. It will be replaced with a new one..

## 2.2 Contents of CD-ROM

The CD-ROM contains the software, manuals, various data sheets, and sample programs which are needed for you to use the Starter Kit.

When using the technical contents of the CD-ROM such as product data, diagrams, and tables or the programs and algorithms also included in the CD-ROM for your application, please be sure to evaluate those technical contents, programs, and algorithms as the whole system, and not individually as single items before you determine whether they are useful. Renesas Technology Corporation will not assume any responsibility regarding their suitability for your application.

The following shows directory configurations of data/manuals included in the CD-ROM.

For details, refer to **Appendix 1**.

Jpn/ Eng + Readme_j.txt/ Readme_e.txt	: README file
+ AcrobatReader	: Tool for read pdf file
+ Tool +	: Software for the M32R Family
+ Cc32r	: Cross Tool Kit for the M32R Family (Trial version)
+ Pd32rm	: Debugger for the M32R Family
+ Kd32r	: Debugger for the M32R Family
+ Ufla32r	: Flash memory reprogramming kit for M32R/ECU by UART
+ Oldversion	: Old version of Tools
+ Document +	: Materials associated with boards
+ M3A-2114	: Materials associated with the 32170/32174/32171/32172/32173 Evaluation board (M3A-2114)
+ M3A-2142	: Materials associated with the 32180/32182 Evaluation board (M3A-2142)
+ M3A-2152	: Materials associated with the 32176 Evaluation board (M3A-2152)
+ M3A-2154	: Materials associated with the 32185/32186/32192/32195/32196 Evaluation board (M3A-2154)
+ M3A-2191	: Connector Pitch Converter for M3A-2114 Evaluation board and M32100T-EZ-E
+ M32100T-EZ-E	: Materials associated with the Emulator for M32R
+ M3A-2145	: Manual for Flash memory reprogramming kit (Ufla32r)
+ Discontinued_model	: Materials associated with the discontinued boards (M3A-2195)
+ Manual	: M32R/ECU manuals, data sheets, M32R Family software manuals
+ SampleProgram	: Application notes and listed object/source files

## 2.3 Other Necessary Items

Before the Starter Kit can be used, the following items should separately be prepared by the user.

- Host PC (see Section 4.2 Host PC Condition)
- Power supply (see Section 4.3 Conditions for the Power Supply Used)
- M32100T-EZ-E (emulator for M32R)

### 3. Usage Precautions

#### 3.1 Guaranteed Scope of the Starter Kit

The Starter Kit was developed for users to trial the 32185/32186/32192/32195/32196 Group microcomputer specifications and development environment. Therefore, the results arising from the use of the Starter Kit are not guaranteed.

When developing/debugging a system product using one of the M32R Family microcomputers, please be sure to use official development tools separately available as you debug.

The Starter Kit should be run on the designated type of host machine (IBM PC/AT compatibles). This designated type of host machine, however, is just an anticipated operating environment for the Starter Kit and does not mean that the Starter Kit operates properly on all relevant types of machines in all relevant environments (e.g., device drivers and peripheral units).

#### 3.2 Regarding About System Power-on Sequence when Connected to the Emulator

- When turning on power, turn on M32100T-EZ-E first and then the M3A-2154 Evaluation Board.
- When turning off power, turn off the M3A-2154 Evaluation Board first and then M32100T-EZ-E. When turning on power again after turning off power, wait for 10 seconds.
- Power to M32100T-EZ-E can be fed from USB cable.

Note: Unless the Starter Kit is powered on this sequence, the kit may operate erratically or break down.

#### 3.3 About M3T-CC32R

M3T-CC32R (M32R Family Cross Tool Kit) included with the Starter Kit is a trial version whose useful period is limited.

This version becomes unusable four months after it is installed. Past this period, it cannot be used even by reinstalling.

If you wish to continue using M3T-CC32R, please purchase a production version of M3T-CC32R separately from distributors.

### 3.4 About M3T-PD32RM

The following describes precautions to be observed when using M3T-PD32RM.

#### 3.4.1 Operating Manuals

To use M3T-PD32RM of M3A-2154G52B, see the manuals shown below.

- M3T-PD32RM release notes
- PD32RM Help

#### 3.4.2 About Break Operation

M3T-PD32RM uses the M32R core's internal debug circuit (SDI) to realize break functions. For this reason, the break functions of M3T-PD32RM behave differently from those in conventional emulators.

Furthermore, because M3T-PD32RM does not have SDI trace pins as corresponding hardware resources, the trace pin corresponding break functions available with M3T-PD32R-compatible emulators are not supported.

The following explains the four types of breaks that can be executed with M3T-PD32RM.

(1) Software break

Up to 64 software breakpoints can be set and executed in RAM areas accessible by the target MCU. No software breakpoints can be set and executed in ROM areas such as the internal flash memory.

(2) Pre-execution PC break

The M32R core's internal debug circuit (SDI) allows setting breakpoints, at which to break the program immediately before executing an instruction (at the address indicated by the program counter).

For the M3A-2154G52B (32185/32186/32192/32195/32196 Group MCU), four such breakpoints can be set.

(3) Post-execution PC break

The M32R core's internal debug circuit (SDI) allows setting one breakpoint, at which to break the program immediately after executing an instruction (at the address indicated by the program counter).

(4) Chip break

The M32R core's internal debug circuit (SDI) allows setting breakpoints, at which to break the program when accessing memory for read/write.

For M3A-2154G52B (32185/32186/32192/32195/32196 Group MCU), two such breakpoints (level 2) can be set.

\* The differences between levels 1 and 2 are outlined below.

Level 1: Whether data which is maskable matches or not can be detected.

Level 2: Data is maskable and an address range can be specified for the target data.

(5) About hardware break

Debug functions of M3T-PD32RM are realized by using the M32R core's internal debug circuit (SDI), and not by using the emulator's hardware resources based on bus signals and debug information from the MCU as in conventional emulators. The pre-execution PC break, post-execution PC break, and chip break alluses this internal debug circuit (SDI). Because the M3T-PD32RM does not have trace pin information available as hardware resources, the hardware break functions cannot be used that use the trace pins implemented in the M3T-PD32R-compatible emulators.

Heed this point when referring to the PD32RM Help.

### 3.4.3 About Security Code Check Function

If the target microcomputer has security code stored in it, the dialog box shown in Figure 3.1 appears at M3T-PD32RM startup. When this dialog box is displayed, enter the appropriate security code. If the security code you've entered does not match the stored security code, M3T-PD32RM will not start unless the contents of the internal flash memory are deleted.

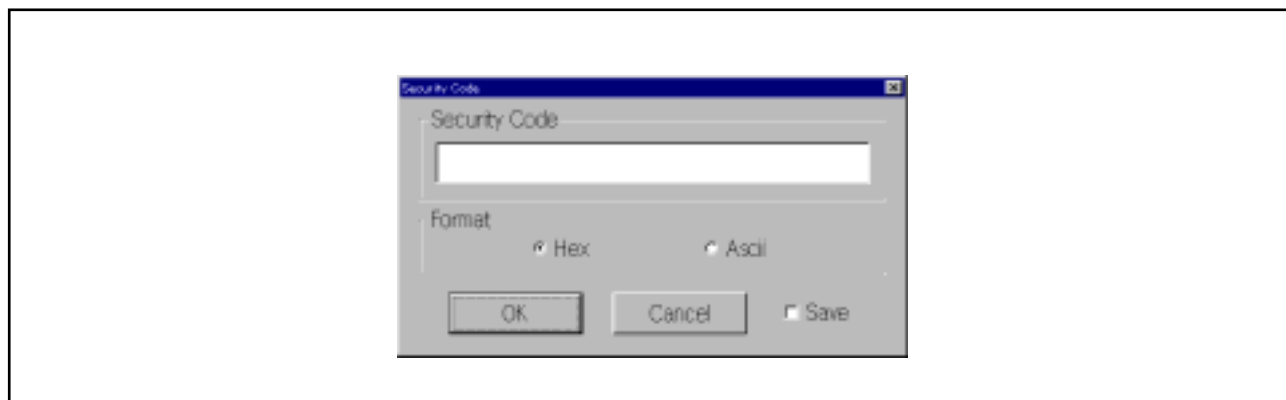


Figure 3.1 Security Code Input Dialog Box

Be sure to enter the security code that you set when writing to the flash memory.

Use the Format select button to choose the format of the security code you entered. Select the Save check box, and the security code you entered is saved. From next time on, the security code saved here is used to check matching with the stored security code when M3T-PD32RM starts.

### 3.5 About Evaluation Board

When the evaluation board does not start operation after supplied power, check the following points.

#### 3.5.1 Contact failure of IC Socket

Oscillation or thermal expansion may cause a poor connection between microcomputers and IC socket on the Evaluation Board. Follow the steps below.

- Screw down the top cover of IC socket with setscrews at four corners.  
The tightening torque shall be 0.054N.m.  
Note that only one tight setscrew may cause a poor connection.

The socket included in the evaluation board uses NQPACK and HQPACK by TOKYO ELETECH CORPORATION.

For more details, visit their website at [http://www.tetc.co.jp/e\\_index.htm](http://www.tetc.co.jp/e_index.htm).

The following illustrates configuration of M3A-2154G02A (32185/32186/32192/32195/32196 Group Evaluation Board).

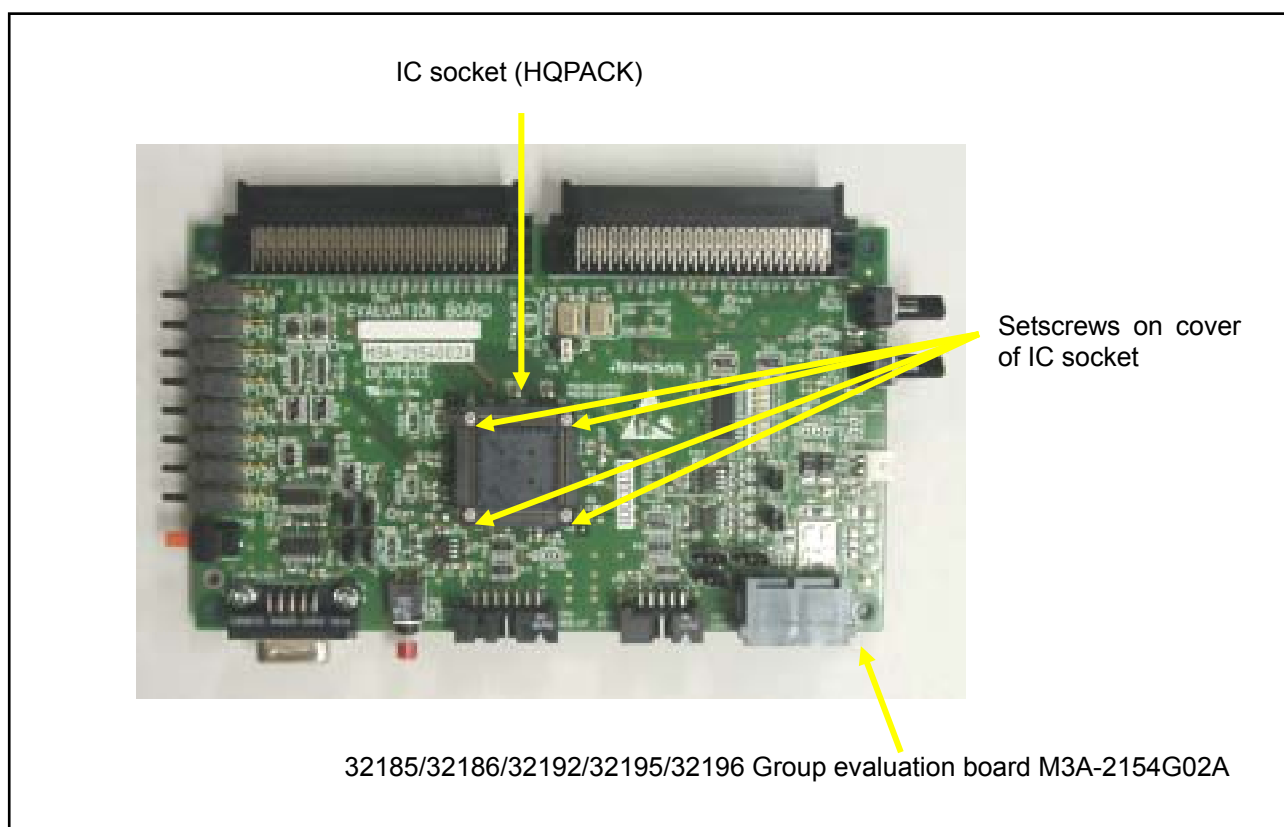


Figure 3.2 Configuration of M3A-2154G02A

#### 3.5.2 Cable Connection

- Make sure the cables are connected to the evaluation board firmly.

## 4. Starter Kit Usage Conditions

The following shows the conditions under which the Starter Kit can be used.

### 4.1 Ambient Conditions

Table 4.1 shows the ambient conditions under which the Starter Kit can be used.

Table 4.1 Operating Environment

Symbol	Parameter	Rated value	Remarks
Topr	Operating ambient temperature	5°C to 35°C	No dewdrops allowed. Corrosive gas environment not allowed.
Tstr	Storage ambient temperature	0°C to 60°C	

### 4.2 Host PC Condition

It is recommended that each software included with the Starter Kit be run on the host PC under the OS listed in Table 4.2.

Table 4.2 Host PC Conditions

Starter Kit Type Name	M3A-2154G52B
Host PC	IBM PC/AT compatibles
CPU	Pentium III 500MHz or higher CPU is recommended
Memory	192 Mbytes or more system memory is recommended
OS	Windows 98, Me, 2000, XP
USB Port	1 port (required)

### 4.3 Conditions for the Power Supply Used

Table 4.3 shows Power Supply Specifications required when using the Starter Kit.

Table 4.3 Power Supply Specifications

Symbol	Power supply voltage	Power supply current
VCC	4.75 V to 5.25 V	1A
GND	0V (reference voltage)	—

## 5. Hardware Setup

This chapter describes how to set up the hardware components necessary to use the Starter Kit. Table 5.1 and Table 5.2 show how to set up the hardware components.

Table 5.1 Hardware Setup Procedure

Setup Procedure	When connected to the emulator	When using the evaluation board by itself
Set the emulator	1st (Refer to 5.1.1)	—
Connect the host PC and emulator	2nd (Refer to 5.1.1)	—
Set the evaluation board	3rd (Refer to 5.1.2)	1st (Refer to 5.3.1)
Connect the evaluation board and emulator	4th (Refer to 5.1.3)	—
Turn on the emulator	5th (Refer to 5.1.4)	—
Turn on the evaluation board	6th (Refer to 5.1.4)	2nd (Refer to 5.3.2)

Table 5.2 Hardware Power Off Procedure

Setup Procedure	When connected to the emulator	When using the evaluation board by itself
Turn off the evaluation board.	1st (Refer to 5.1.4)	1st (Refer to 5.3.2)
Turn off the emulator.	2nd (Refer to 5.1.4)	—

### 5.1 M3A-2154 Evaluation Board Hardware Setup

#### 5.1.1 M32100T-EZ-E Power Supply and Settings

The following shows how to set M32100T-EZ-E.

For more details, refer to **M32100T-EZ-E User's Manual**.

M32100T-EZ-E is supplied power from the host PC via USB cable, and it turns ON by connecting included USB cable.

The Connecting M32100T-EZ-E and Host PC is shown in Figure 5.1

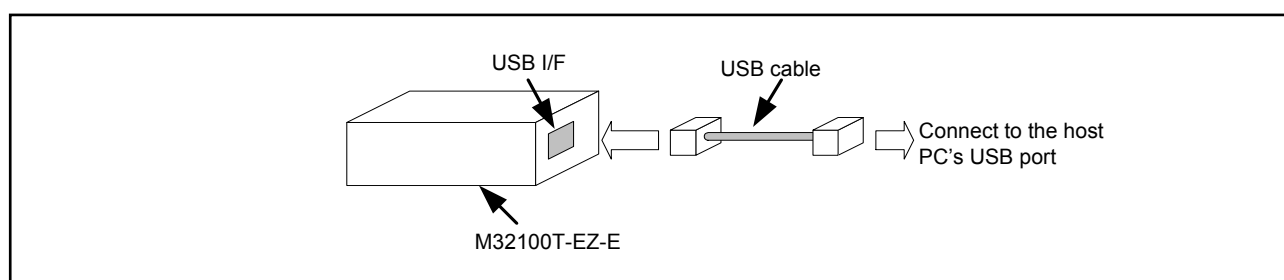


Figure 5.1 Connecting M32100T-EZ-E and Host PC



### 5.1.2 M3A-2154 Evaluation Board Power Supply and Setting

The following shows how to set the M3A-2154 Evaluation Board.

Use a 5V DC power supply to feed power to the M3A-2154 Evaluation Board.

Use included 5V power supply cable to connect the 5V DC power supply and CN2 connector included with the M3A-2154 Evaluation Board.

The Connecting when Feeding Power to the M3A-2154 Evaluation Board is shown in Figure 5.2.

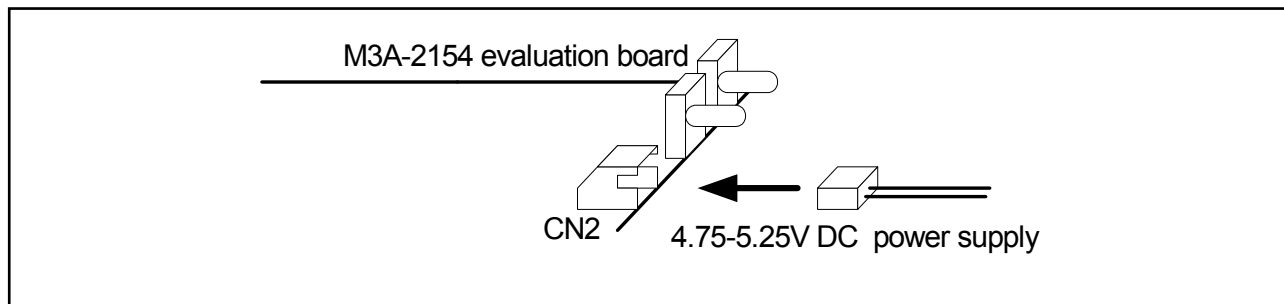


Figure 5.2 Connecting when Feeding Power to the M3A-2154 Evaluation Board

### 5.1.3 Connecting M3A-2154 Evaluation Board and M32100T-EZ-E

Use an included 10-pin flat cable to connect M32100T-EZ-E and XCN1 connector included with the M3A-2154 Evaluation Board.

The Connecting M3A-2154 Evaluation Board and M32100T-EZ-E is shown in Figure 5.3.

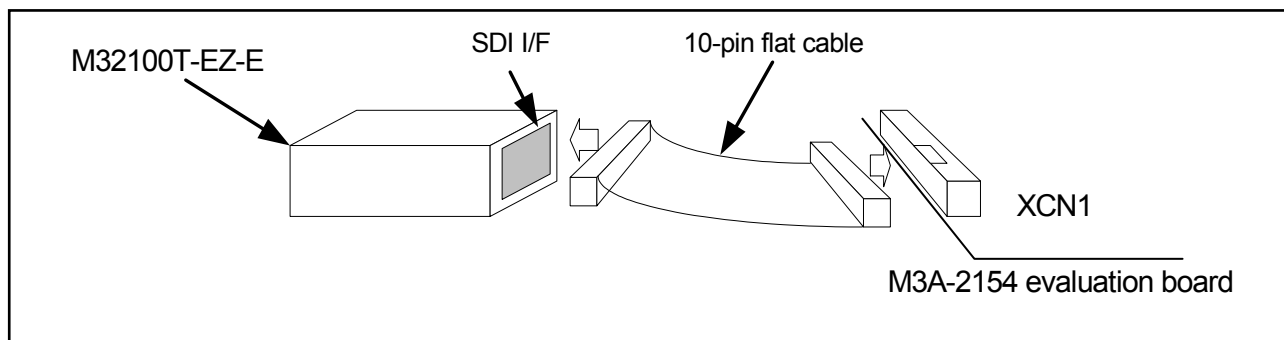


Figure 5.3 Connecting M3A-2154 Evaluation Board and M32100T-EZ-E

### 5.1.4 Power Supply when Connecting M32100T-EZ-E

- When turning on power, turn on M32100T-EZ-E first and then the M3A-2154 Evaluation Board.
- When turning off power, turn off the M3A-2154 Evaluation Board first and then M32100T-EZ-E.  
When turning on power again after turning off power, wait for 10 seconds.
- Power to M32100T-EZ-E can be fed from USB cable.

Note: Unless the Starter Kit is powered on this sequence, the kit may operate erratically or break down.

## 5.2 Hardware Setup when the Evaluation Board by Itself in Use

### 5.2.1 M3A-2154 Evaluation Board Power Supply and Settings

The following shows how to set the M3A-2154 Evaluation Board.

Use a 5V DC power supply to feed power to the M3A-2154 Evaluation Board.

Use an included 5V power supply cable to connect the 5V DC power supply and CN2 connector included with the M3A-2154 Evaluation Board.

The Connecting when Feeding Power to the M3A-2154 Evaluation Board is shown in Figure 5.4

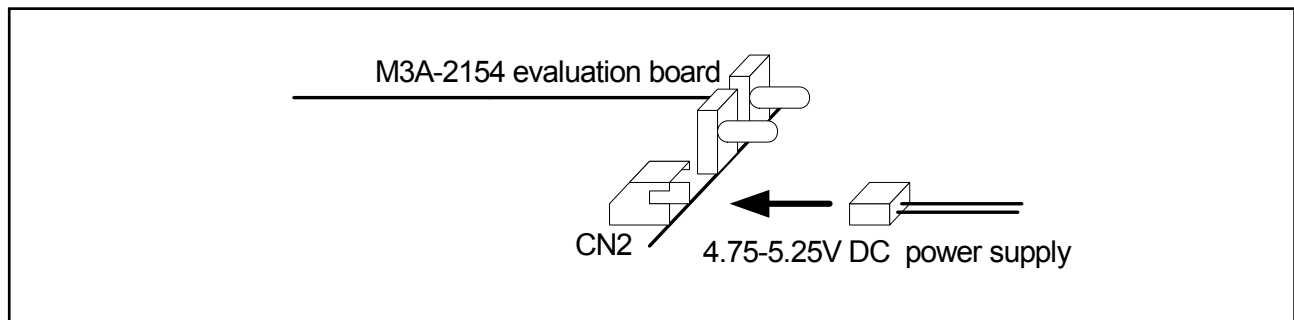


Figure 5.4 Connecting when Feeding Power to the M3A-2154 Evaluation Board

### 5.2.2 M3A-2154 Power Supply

Connecting the 5V power supply with the included cable turns the M3A-2154 Evaluation Board powered on.

By disconnecting it, the M3A-2154 Evaluation Board turns powered off.

## 6. Software Setup

### 6.1 M3T-PD32RM

M3T-PD32RM is the debugger software that controls M32100T-EZ-E from the host PC.

#### 6.1.1 Installing M3T-PD32RM

[Notes]

**Make sure that the installer is executed by one who is authorized as an Administrator when Windows 2000/XP is used as an operating system of the host machine.**

**No one but the user who has the authority of an Administrator can install M3T-PD32RM.**

- (1) Run pd32rmv301r00\_e.exe that is included in the Eng \ Tool \ Pd32rm directory of the CD-ROM.
- (2) Proceed to install M3T-PD32RM following messages on the installation screen.
- (3) When you finished installing M3T-PD32RM, the dialog box shown in Figure 6.1 appears.



Figure 6.1 Dialog Box when Installation is Finished

## 6.1.2 Starting M3T-PD32RM

Before starting M3T-PD32RM, make sure the hardware components have been set up in accordance with the instructions in 5.1 M3A-2154 Evaluation Board Hardware Setup, and that the Starter Kit hardware system (M3A-2154 Evaluation Board and M32100T-EZ-E) have been powered on. Make sure that M3T-PD32RM cannot be started unless the power to the hardware system is turned on.

To start M3T-PD32RM, choose

[Start] -> [Programs] -> [Renesas] -> [PD32RM V3.01 Release 00] -> [PD32RM]  
from Start menu of Windows. When M3T-PD32RM starts, the initialize dialog box shown in Figure 6.2 appears. So initialize M3T-PD32RM from this dialog box.

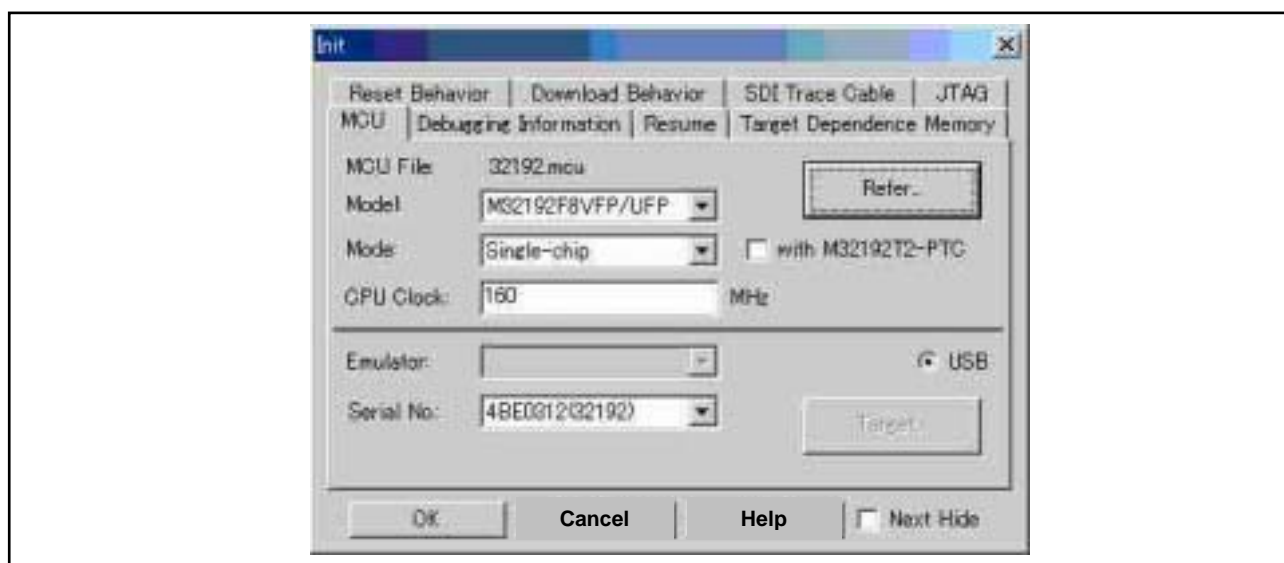


Figure 6.2 M3T-PD32RM Initialize Dialog Box

### Setting MCU File

Click the MCU tab in the initialize dialog box (see **Figure 6.2**) and then the “Refer” button. This brings up a dialog box for setting MCU files. In this dialog box, select the MCU file described below.

Table 6.1 MCU File

MCU group name	MCU file name
32185	32185.mcu
32186	32186.mcu
32192	32192.mcu
32195	32195.mcu
32196	32196.mcu

This MCU file is stored in directory: (installed location) \ PD32RM \ MCUFILERS.

### Setting Model

While the MCU tab is open, select the appropriate MCU type from Model selection.

### Setting Mode

While the MCU tab is open, select the appropriate MCU operation mode from Mode selection.

## Setting CPU Clock

Case of using 32192 or 32195 or 32196 Group, while the MCU tab is open, select the "160" for the appropriate CPU Clock.

Case of using 32185 or 32186 Group, while the MCU tab is open, select the "80" for the appropriate CPU Clock.

## Checking Serial No.

While the MCU tab is open, make sure the Serial No. is in accordance with the following.

M3T-PD32RM can be started only with Serial No. as follows:

Table 6.2 Serial No.

MCU group name	Serial No. for using M3T-PD32RM	Example of serial No.
32185	7-digit serial number 7-digit serial number (32185) (Note 1)	- 5AE0670 - 5AE0670 (32185)
32186	7-digit serial number 7-digit serial number (32186) (Note 1)	- 5AE0670 - 5AE0670 (32186)
32192	7-digit serial number 7-digit serial number (32192) (Note 1)	- 5AE0670 - 5AE0670 (32192)
32195	7-digit serial number 7-digit serial number (32195) (Note 1)	- 5AE0670 - 5AE0670 (32195)
32196	7-digit serial number 7-digit serial number (32196) (Note 1)	- 5AE0670 - 5AE0670 (32196)

Note 1: The number in parenthesis after 7 digits serial number shows MCU Group name with activation of M3T-PD32RM.

## Selecting a Cross Tool

While the Debugging Information tab is open, select "CC32R(M32R)" for Compiler.

For the Starter Kit, M3T-CC32R is the only cross tool which has had its operation guaranteed.

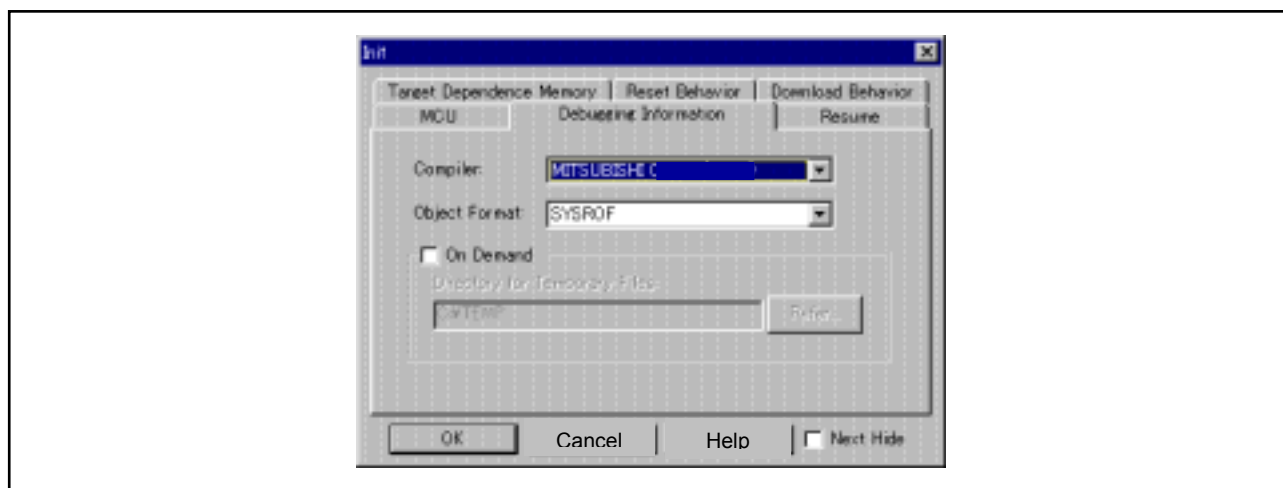


Figure 6.3 Selecting a Cross Tool

When you have finished the above initialization, click the “OK” button to start M3T-PD32RM. If M3T-PD32RM communicates normally with the target system, it starts up and the M3T-PD32RM window shown in Figure 6.4 appears. For details on how to use it, refer to the PD32RM Help.

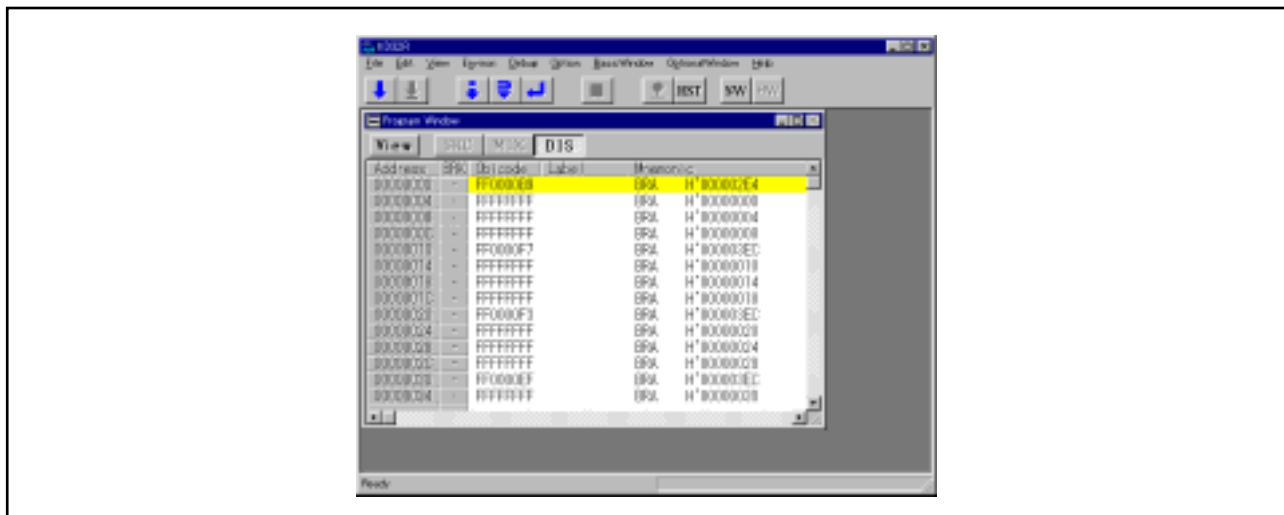


Figure 6.4 M3T-PD32RM Window at Normal Startup

### 6.1.3 Error Messages During M3T-PD32RM Startup

If M3T-PD32RM cannot communicate normally with the target system, it appears an error message in a pop-up box.

Causes of Errors on the M3A-2154 Evaluation Board

If the error pop-up box shown in Figure 6.5 appears when starting M3T-PD32RM, check whether power is supplied to the M3A-2154 Evaluation Board and whether it is firmly connected to M32100T-EZ-E.



Figure 6.5 Error Message at Startup (Error on the M3A-2154 Evaluation Board Side)

If the error pop-up box is appeared when starting M3T-PD32RM, correct the cause of error and then click the “OK” button in that pop-up box. This brings up the initialize window, allowing you to retry the startup. In this case, you can retry only once.

#### 6.1.4 Terminating M3T-PD32RM

To terminate M3T-PD32RM, choose [File] -> [Exit] from the pulldown menu. Then, a dialog box appears prompting you for your confirmation (see **Figure 6.6**). Click the “OK” button in that dialog box to quit M3T-PD32RM. Or click the “Cancel” button, in which case M3T-PD32RM does not terminate.

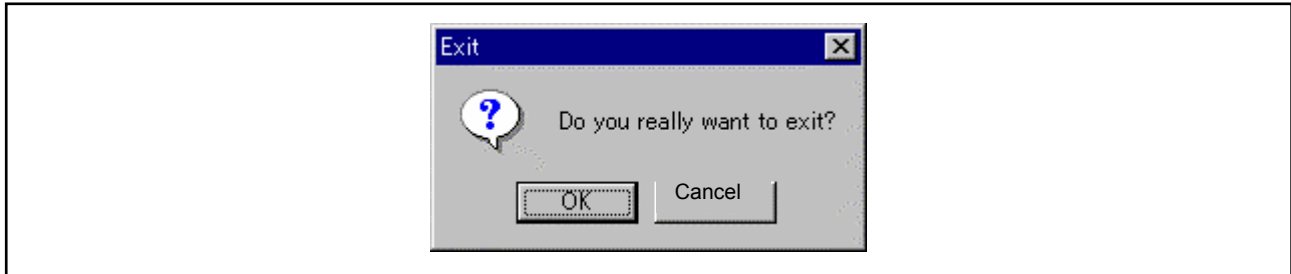


Figure 6.6 Dialog Box for Confirming Whether to Quit M3T-PD32RM

## 6.2 M3T-CC32R

### 6.2.1 Installing M3T-CC32R

- (1) Run cc32rv500r00\_e.exe that is included in the Eng \ Tool \ Cc32r directory of the CD-ROM.
- (2) Proceed to install M3T-CC32R following messages on the installation screen.
- (3) When you are asked to select the license type of M3T-CC32R, select "Trial License".
- (4) While installing M3T-CC32R, you will be asked to confirm whether to change AUTOEXEC.BAT variables. If you chose "Not to Change", add the following contents to AUTOEXEC.BAT.

(Setting example for M3T-CC32R environment variables)

```
REM ***** Environment variables for CC32R *****
SET M32RBIN = (installed directory) ¥bin32R
SET M32RLIB = (installed directory) ¥lib32R
SET M32RINC = (installed directory) ¥inc32R
SET M32RTMP = (installed directory) ¥TMP
SET PATH=%M32RBIN%;%PATH%
```

- (5) If you corrected AUTOEXEC.BAT, be sure to restart your computer after you finished installing M3T-CC32R.

### 6.2.2 Verifying Whether M3T-CC32R is Installed Normally

Execute the following operation from the DOS prompt. This helps to verify whether M3T-CC32R has been installed normally. For details about M3T-CC32R, refer to the CC32R User's Manual.

- Command

C: \ >cc32r -V (V in uppercase)

- Result

If M3T-CC32R has been installed normally, a command version of M3T-CC32R like the one shown below is displayed.

```
CC32R Compiler for M32R Family V.X.XX Release X
Copyright 1995-XXXX RENESAS TECHNOLOGY CORPORATION
AND RENESAS SOLUTIONS CORPORATION
ALL RIGHTS RESERVED.
(X varies with the version of the Cross Tool Kit included in the package.)
```

Displayed below this is the version information of each tool included in the Cross Tool Kit.

- If M3T-CC32R does not start

If M3T-CC32R does not start, check the following.

- 1) See if the environmental variables (M32RBIN, M32LIB, M32RINC, M32RTMP command paths) are set correctly.
- 2) See if cc32r.exe is correctly expanded in the directory specified in M32RBIN.

## 6.3 Browsing Electronic Manuals

The Starter Kit manuals each are provided as Portable Document Format (PDF) files.

To browse electronic manuals, you need to have Acrobat Reader. The CD-ROM supplied with the Starter Kit contains Acrobat Reader in its Acrobat directory, so install the desired version of Acrobat Reader from the CD-ROM. Acrobat Reader can also be downloaded from the Adobe Systems home page.



## Appendix 1 Contents of CD-ROM

### 1. Contents of CD-ROM

The CD-ROM contains the software, manuals, various data sheets, and sample programs which are needed for you to use the Starter Kit.

When using the technical contents of the CD-ROM such as product data, diagrams, and tables or the programs and algorithms also included in the CD-ROM for your application, please be sure to evaluate those technical contents, programs, and algorithms as the whole system, and not individually as single items before you determine whether they are useful. Renesas Technology Corporation will not assume any responsibility regarding their suitability for your application.

The following shows directory configurations and contents of the CD-ROM.

Jpn/ Eng + Readme_j.txt/ Readme_e.txt : README file	
+ AcrobatReader	: Tool for read pdf file
+ Tool +	: Software for the M32R Family
+ Cc32r	: Cross Tool Kit for the M32R Family (Trial version)
+ Pd32rm	: Debugger for the M32R Family
+ Kd32r	: Debugger for the M32R Family
+ Ufla32r	: Flash memory reprogramming kit for M32R/ECU by UART
+ Oldversion	: Old version of Tools
+ Document +	: Materials associated with boards
+ M3A-2114	: Materials associated with the 32170/32174/32171/32172/32173 Evaluation board (M3A-2114)
+ M3A-2142	: Materials associated with the 32180/32182 Evaluation board (M3A-2142)
+ M3A-2152	: Materials associated with the 32176 Evaluation board (M3A-2152)
+ M3A-2154	: Materials associated with the 32185/32186/32192/32195/32196 Evaluation board (M3A-2154)
+ M3A-2191	: Connector Pitch Converter for M3A-2114 Evaluation board and M32100T-EZ-E
+ M32100T-EZ-E	: Materials associated with the Emulator for M32R
+ M3A-2145	: Manual for Flash memory reprogramming kit (Ufla32r)
+ Discontinued_model	: Materials associated with the discontinued boards (M3A-2195)
+ Manual	: M32R/ECU manuals, data sheets, M32R Family software manuals
+ SampleProgram	: Application notes and listed object/source files

## 1.1 Acrobat

The CD-ROM contains files necessary to read manuals (PDF files). The documents included in the CD-ROM have been verified to be displayed and printed using the following versions of Acrobat. If you have trouble displaying or printing documents with other Acrobat versions, install the appropriate Acrobat version from the CD-ROM into your computer.

### (English version)

Eng + AcrobatReader	+ V3 + (For Windows95)	
	+ Ar32e301.EXE	: PDF reader installation software
	+ Readme.txt	: README file
	+ V4 + (For Version4)	
	+ ArR0ENG.EXE	: PDF reader installation software
	+ Readme.txt	: README file
	+ Win16e + (For Windows3.1)	
	+ AR16E301.EXE	: PDF reader installation software
	+ Readme.txt	: README file

### (Japanese version)

Jpn + AcrobatReader	+ AR40JPN.EXE	: PDF reader installation software
	+ Readme.txt	: README file

## 1.2 Tool

### (1) M3T-CC32R

M3T-CC32R (Cross Tool Kit for the M32R Family, trial version whose useful period is limited) is included. Its directory structure is shown below.

#### (English version)

Eng+Tool+Cc32r+

- + cc32rv500r00\_e.exe : Setup programs for M3T-CC32R
- + rej10j0931\_as32r\_u.pdf : M3T-CC32R user's manual (Assembler)
- + rej10j0930\_cc32r\_u.pdf : M3T-CC32R user's manual (C Compiler)
- + mapue.pdf : MAP Viewer user's manual

#### (Japanese version)

Jpn+Tool+Cc32r+

- + cc32rv500r00\_j.exe : Setup programs for M3T-CC32R
- + as32ruj.pdf : M3T-CC32R user's manual (Assembler)
- + cc32ruj.pdf : M3T-CC32R user's manual (C Compiler)
- + mapuj.pdf : MAP Viewer user's manual

### (2) M3T-PD32RM

M3T-PD32RM (Debugger for M32100T-EZ-E) is included. This debugger software (Windows-compliant version) is used to control the microcomputer on the evaluation board from the host PC by connecting M32100T-EZ-E and the host PC with USB cable. Its directory structure is shown below.

#### (English version)

Eng+Tool+Pd32rm+

- + pd32rmv301r00\_e.exe : Setup programs for M3T-PD32RM
- + rej10j1494\_pd32rm\_n.pdf : M3T-PD32RM release note

#### (Japanese version)

Jpn+Tool+Pd32rm+

- + pd32rmv301r00\_j.exe : Setup programs for M3T-PD32RM
- + rjj10j1800\_pd32rm\_n.pdf : M3T-PD32RM release note

## (3) M3S-KD32R (Discontinued)

M3S-KD32R (Debugger for the Starter Kit) is included. This debugger software (Windows-compliant version) is used to control the microcomputer on the evaluation board from the host PC by connecting it and the host PC with LPT parallel cable through the M3A-2195 (SDI Interface Board). Its directory structure is shown below.

## (English version)

Eng+Tool+Kd32r+

+ KD32RNE.pdf	: M3S-KD32R release note
+ W95E	: Setup programs for M3S-KD32R

## (Japanese version)

Jpn+Tool+Kd32r+

+ KD32RNJ.pdf	: M3S-KD32R release note
+ W95J	: Setup programs for M3S-KD32R

## (4) M3S-UFLA32R

M3S-UFLA32R is included. M3S-UFLA32R is the software to program into internal flash memory on M32R/ECU series 3217x,3218x Group microcomputers from Windows version personal computer(PC/AT), by using UART communication. Its directory structure is shown below.

## (English version)

Eng+Tool+Ufla32r+

+ UFLA32Rue.pdf	: M3S-UFLA32R user's manual
+ W95E	: Setup programs for M3S-UFLA32R

## (Japanese version)

Jpn+Tool+Ufla32r+

+ UFLA32Ruj.pdf	: M3S-UFLA32R user's manual
+ W95J	: Setup programs for M3S-UFLA32R

## (5) Oldversion

Old versions of tools are included.

Its directory structure is shown below.

## (English version)

Eng+Tool+Oldversion+

+ Cc32rv3	: Objects for M3T-CC32R Version 3
+ Cc32rv41	: Objects for M3T-CC32R Version 4.1
+ Cc32rv42	: Objects for M3T-CC32R Version 4.2
+ Cc32rv43	: Objects for M3T-CC32R Version 4.3
+ Pd32rmv2	: Objects for M3T-PD32RM Version 2
+ Pd32rmv21	: Objects for M3T-PD32RM Version 2.1
+ Pd32rmv3	: Objects for M3T-PD32RM Version 3
+ Kd32rv3	: Objects for M3S-KD32R Version 3

## (Japanese version)

Jpn+Tool+Oldversion+

+ Cc32rv3	: Objects for M3T-CC32R Version 3
+ Cc32rv41	: Objects for M3T-CC32R Version 4.1
+ Cc32rv42	: Objects for M3T-CC32R Version 4.2
+ Cc32rv43	: Objects for M3T-CC32R Version 4.3
+ Pd32rmv2	: Objects for M3T-PD32RM Version 2
+ Pd32rmv21	: Objects for M3T-PD32RM Version 2.1
+ Pd32rmv3	: Objects for M3T-PD32RM Version 3
+ Kd32rv3	: Objects for M3S-KD32R Version 3
+ Ufla32rv13	: Objects for M3S-UFLA32R Version 1.3

### 1.3 Manual

The M32R Family related manuals and data sheets are included in PDF file format.

#### (English version)

##### Eng + Manual +

+ Readme_e.txt	: README file
+ e32rsm.pdf	: M32R Family software manual
+ rej09b0112_32fpusm.pdf	: M32R-FPU software manual
+ e32170um.pdf	: 32170/32174 Group user's manual
+ e32172um.pdf	: 32172/32173 Group user's manual
+ rej06b0048_32180um.pdf	: 32180 Group user's manual
+ rej09b0014_32182um.pdf	: 32182 Group user's manual
+ rej09b0015_32171um.pdf	: 32171 Group user's manual
+ rej09b0067-0110_32176hm.pdf	: 32176 Group hardware manual
+ rej09b0123-0101_32192hm.pdf	: 32192/32196 Group hardware manual
+ rej09b0235_32186hm.pdf	: 32186 Group hardware manual

#### (Japanese version)

##### Jpn + Manual +

+ Readme_j.txt	: README file
+ j32rsm.pdf	: M32R Family software manual
+ rjj09b0107_32fpusm.pdf	: M32R-FPU software manual
+ rjj09b0123_32176no.pdf	: 32176 Group precautions
+ j32170um.pdf	: 32170/32174 Group user's manual
+ j32171um.pdf	: 32171 Group user's manual
+ j32172um.pdf	: 32172/32173 Group user's manual
+ j32180um.pdf	: 32180 Group user's manual
+ rjj09b0001_32176um.pdf	: 32176 Group user's manual
+ rjj09b0053_32182um.pdf	: 32182 Group user's manual
+ rjj09b0099_32192hm.pdf	: 32192/32195/32196 Group hardware manual
+ rjj09b0246-0100_32186hm.pdf	: 32186 Group hardware manual
+ 32470210j.pdf	: Errata table for 32182 Group user's manual
+ 32580401j.pdf	: Errata table for 32170/32174 Group user's manual
+ 32590401j.pdf	: Errata table for 32171 Group user's manual
+ 32630402j.pdf	: Errata table for 32180 Group user's manual
+ 32680404j.pdf	: Errata table for 32172/32173 Group user's manual
+ tn32ra074aj.pdf	: Errata table for 32186 Group user's manual

## 1.4 Board Related Manual (Document)

The product standards, part list, connection diagrams and user's manuals for the evaluation board in Starter Kit are included in PDF file format.

### (1) M3A-2114 Evaluation Board related documents

The related documents for the 32170/32171/32172/32173/32174 Group Evaluation Board are included in PDF file format.

#### (English version)

Eng+Document+M3A-2114+

- + Readme\_e.txt : README file
- + 2114um\_e.pdf : M3A-2114 Starter Kit use's manual
- + 2114g02sk\_e.pdf : M3A-2114G02 product standards
- + 2114g12sk\_e.pdf : M3A-2114G12 product standards
- + 2114g22sk\_e.pdf : M3A-2114G22 product standards
- + cdrom\_e.pdf : Content list of CD-ROM

#### (Japanese version)

Jpn+Document+M3A-2114+

- + Readme\_j.txt : README file
- + 2114um\_j.pdf : M3A-2114 Starter Kit use's manual
- + 2114g02sk\_j.pdf : M3A-2114G02 product standards
- + 2114g12sk\_j.pdf : M3A-2114G12 product standards
- + 2114g22sk\_j.pdf : M3A-2114G22 product standards
- + cdrom\_j.pdf : Content list of CD-ROM

### (2) M3A-2142 Evaluation Board related documents

The related documents for the function extension board and the 32180/32182 Group Evaluation Board are included in PDF file format.

#### (English version)

Eng+Document+M3A-2142+

- + Readme\_e.txt : README file
- + 2142um\_e.pdf : M3A-2142 Starter Kit use's manual
- + 2142g01sk\_e.pdf : M3A-2142G01 product standards
- + 2142g03sk\_e.pdf : M3A-2142G03 product standards
- + cdrom\_e.pdf : Content list of CD-ROM

#### (Japanese version)

Jpn+Document+M3A-2142+

- + Readme\_j.txt : README file
- + 2142um\_j.pdf : M3A-2142 Starter Kit use's manual
- + 2142g01sk\_j.pdf : M3A-2142G01 product standards
- + 2142g03sk\_j.pdf : M3A-2142G03 product standards
- + cdrom\_j.pdf : Content list of CD-ROM

## (3) M3A-2152 Evaluation Board related documents

The related documents for the 32176 Group Evaluation Board are included in PDF file format.

## (English version)

Eng+Document+M3A-2152+

+ Readme\_e.txt : README file  
+ rej10b0224\_2152um.pdf : M3A-2152 Starter Kit use's manual

## (Japanese version)

Jpn+Document+M3A-2152+

+ Readme\_j.txt : README file  
+ rjj10b0233\_2152um.pdf : M3A-2152 Starter Kit use's manual

## (4) M3A-2154 Evaluation Board related documents

The related documents for the 32185/32186/32192/32195/32196 Group Evaluation Board are included in PDF file format.

## (English version)

Eng+Document+M3A-2154+

+ Readme\_e.txt : README file  
+ rej10b0223\_2154um.pdf : M3A-2154 Starter Kit use's manual

## (Japanese version)

Jpn+Document+M3A-2154+

+ Readme\_j.txt : README file  
+ rjj10b0231\_2154um.pdf : M3A-2154 Starter Kit use's manual

## (5) M32100T-EZ-E related documents

M32100T-EZ-E documents are included in PDF file format.

## (English version)

Eng+Document+M32100T-EZ-E+

+ Readme\_e.txt : README file  
+ rej10j0002\_m32100teze\_u.pdf : M32100T-EZ-E use's manual  
+ rej10j0013\_m32100teze\_s.pdf : M32100T-EZ-E release note

## (Japanese version)

Jpn+Document+M32100T-EZ-E+

+ Readme\_j.txt : README file  
+ rjj10j0002\_m32100teze\_u.pdf : M32100T-EZ-E use's manual  
+ rjj10j0014\_m32100teze\_s.pdf : M32100T-EZ-E release note



(6) M3A-2191 Pitch Converter related documents

The M3A-2114 Evaluation Board and M3A-2195 Interface Board connecting pitch converter related documents are included in PDF file format.

(English version)

Eng+Document+M3A-2191+

+ Readme_e.txt	: README file
+ rej10b0228_2191sk.pdf	: M3A-2191 product standards
+ cdrom_e.pdf	: Content list of CD-ROM

(Japanese version)

Jpn+Document+M3A-2191+

+ Readme_j.txt	: README file
+ rjj10b0237_2191sk.pdf	: M3A-2191 product standards
+ cdrom_j.pdf	: Content list of CD-ROM

(7) M3A-2145 Evaluation Board related documents

The related documents for the M3S-UFLA32R are included in PDF file format.

(English version)

Eng+Document+M3A-2145+

+ Readme_e.txt	: README file
+ 2145g50sk_e.pdf	: M3A-2145G50 product standards
+ 2145g02sk_e.pdf	: M3A-2145G02 product standards
+ 2145g50p_e.pdf	: M3A-2145G50 part list
+ 2145g02p_e.pdf	: M3A-2145G02 part list
+ cdrom_e.pdf	: Content list of CD-ROM

(Japanese version)

Jpn+Document+M3A-2145+

+ Readme_j.txt	: README file
+ 2145g50sk_j.pdf	: M3A-2145G50 product standards
+ 2145g02sk_j.pdf	: M3A-2145G02 product standards
+ 2145g50p_j.pdf	: M3A-2145G50 part list
+ 2145g02p_j.pdf	: M3A-2145G02 part list
+ cdrom_j.pdf	: Content list of CD-ROM

## (8) M3A-2195 SDI Interface Board related documents (Discontinued)

The SDI Interface Board documents are included in PDF file format.

## (English version)

Eng+Document+Discontinued\_model+M3A-2195+

- + Readme\_e.txt : README file
- + 2195g50sk\_e.pdf : M3A-2195G50 product standards
- + 2195c\_e.pdf : M3A-2195 Evaluation Board connection diagram
- + 2195p\_e.pdf : M3A-2195 part list
- + 2195g50p\_e.pdf : M3A-2195G50 part list
- + 2195um\_e.pdf : M3A-2195 user's manual
- + cdrom\_e.pdf : Content list of CD-ROM

## (Japanese version)

Jpn+Document+Discontinued\_model+M3A-2195+

- + Readme\_j.txt : README file
- + 2195g50sk\_j.pdf : M3A-2195G50 product standards
- + 2195c\_j.pdf : M3A-2195 Evaluation Board connection diagram
- + 2195p\_j.pdf : M3A-2195 part list
- + 2195g50p\_j.pdf : M3A-2195G50 part list
- + 2195um\_j.pdf : M3A-2195 user's manual
- + cdrom\_j.pdf : Content list of CD-ROM

## (9) M3A-2128 Evaluation Board related documents (Discontinued)

The related documents for the 32170 Group Evaluation Board are included in PDF file format.

## (Japanese version)

Jpn+Document+Discontinued\_model+M3A-2128+

- + Readme\_j.txt : README file
- + 2128im\_j.pdf : M3A-2128 installation manual
- + 2128um\_j.pdf : M3A-2128 Starter Kit user's manual
- + 2128sk\_j.pdf : M3A-2128 product standards
- + 2128g50p\_j.pdf : M3A-2128G50 part list
- + cdrom\_j.pdf : Content list of CD-ROM

## (10) M3A-2154 Evaluation Board related documents (Discontinued)

The related documents for the 32192 Group Evaluation Board are included in PDF file format.

## (English version)

Eng+Document+Discontinued\_model+M3A-2154G52A+

- + Readme\_e.txt : README file
- + 2154g52aum\_e.pdf : M3A-2154 Starter Kit user's manual
- + 2154g02sk\_e.pdf : M3A-2154G02 product standards

## (Japanese version)

Jpn+Document+Discontinued\_model+M3A-2154G52A+

- + Readme\_j.txt : README file
- + 2154g52aum\_j.pdf : M3A-2154 Starter Kit user's manual
- + 2154g02sk\_j.pdf : M3A-2154G02 product standards

(11) M3A-2142G04 Board related documents (Discontinued)

The related documents for the MCU pin processing Board are included in PDF file format.

(English version)

Eng+Document+Discontinued\_model+M3A-2142G04+

+ Readme_e.txt	: README file
+ 2142g04sk_e.pdf	: M3A-2142G04 product standards
+ cdrom_e.pdf	: Content list of CD-ROM

(Japanese version)

Jpn+Document+Discontinued\_model+M3A-2142G04+

+ Readme_j.txt	: README file
+ 2142g04sk_j.pdf	: M3A-2142G04 product standards
+ cdrom_j.pdf	: Content list of CD-ROM

## 1.5 Sample Program

The application notes, the object and source files of sample programs for the M32R/ECU's peripheral functions to be written into the M32R/ECU's internal flash memory that can be used on the Evaluation Board for Starter kit, are included in the CD-ROM

(English version)

Eng+SampleProgram+

+ 32170_32171	: 32170/32171 Group application notes and sample programs
+ 32172_32173	: 32172/32173 Group application notes and sample programs
+ 32176	: 32176 Group application notes and sample programs
+ 32180_32182	: 32180/32182 Group application notes and sample programs
+ 32185_32186	: 32185/32186 Group application notes and sample programs
+ 32192_32195_32196	: 32192/32195/32196 Group application notes and sample programs

(Japanese version)

Jpn+SampleProgram+

+ Readme.html	: README file
+ 32170_32171	: 32170/32171 Group application notes and sample programs
+ 32172_32173	: 32172/32173 Group application notes and sample programs
+ 32176	: 32176 Group application notes and sample programs
+ 32180_32182	: 32180/32182 Group application notes and sample programs
+ 32185_32186	: 32185/32186 Group application notes and sample programs
+ 32192_32195_32196	: 32192/32195/32196 Group application notes and sample programs

## Appendix 2 Part List

A part list is provided in following pages for your reference.

Handling	Classification	No.	Title		Division in charge	
Created	Part List	PPL-M3A-2154G52B	M3A-2154G52B			
Checked		Revision				

Item No.	Part Name		Part Specification			Required Q'ty per Unit	Supply Classification	Remarks
	Description	Part No.	Part Type Name (Drawing No., Product Specification)	Manufacturer Name	Mounting Direction			
1	M32R/ECU#6HL Evaluation board	PLL-M3A-2154G02A	M3A-2154G02A			1		
2	CD-ROM					1		
3	IMPORTANT-READ ME FIRST					1		
4	IMPORTANT-READ ME FIRST (Japanese)					1		
5	Starter kit M3A-2154G52A release note					1		
6	Starter kit M3A-2154G52A release note (Japanese)					1		
*								
Special note:			Special note:					
(1) Blank columns denote the same content as the upper row.								
(2) If two or more part type names are written for one part, the upper row has priority.								
(3) The asterisk (*) in the item No. column denotes that the rest is blank.								

## Appendix 3 M3A-2154G02A Product Standards

This manual describes how to operate the M3A-2154G02A (32185/32186/32192/32195/32196 Group Evaluation Board)

## 1. Overview

### 1.1 Outline of the Product

Table 1.1 Mounted Microcomputer Type

Mounted microcomputer type name		Evaluation board type name (socket mounted type)
M32192F8VFP	Default	M3A-2154G02A
M32186F8VFP	(Note1)	

Note1: Using M32186F8VFP, setting of oscillator circuit should be changed. For details, refer to chapter **2.5 Oscillator circuit**.

Table 1.2 Specification of Product

Operation mode	Single-chip mode, Processor mode and External extension mode
Board extension	Can be extended using the board's extension connector
CAN I/F	Comes standard with a 2-channel CAN connector, CAN cable included
RS-232C I/F	Comes standard with a connector
Serial port	One of four channels can be selected using a rotary switch
Analog port	Inputs on two channels can be controlled using variable resistor (VR) controls
Display I/O	Comes with a single-port LED
Input I/O	Comes with a single-port toggle switch

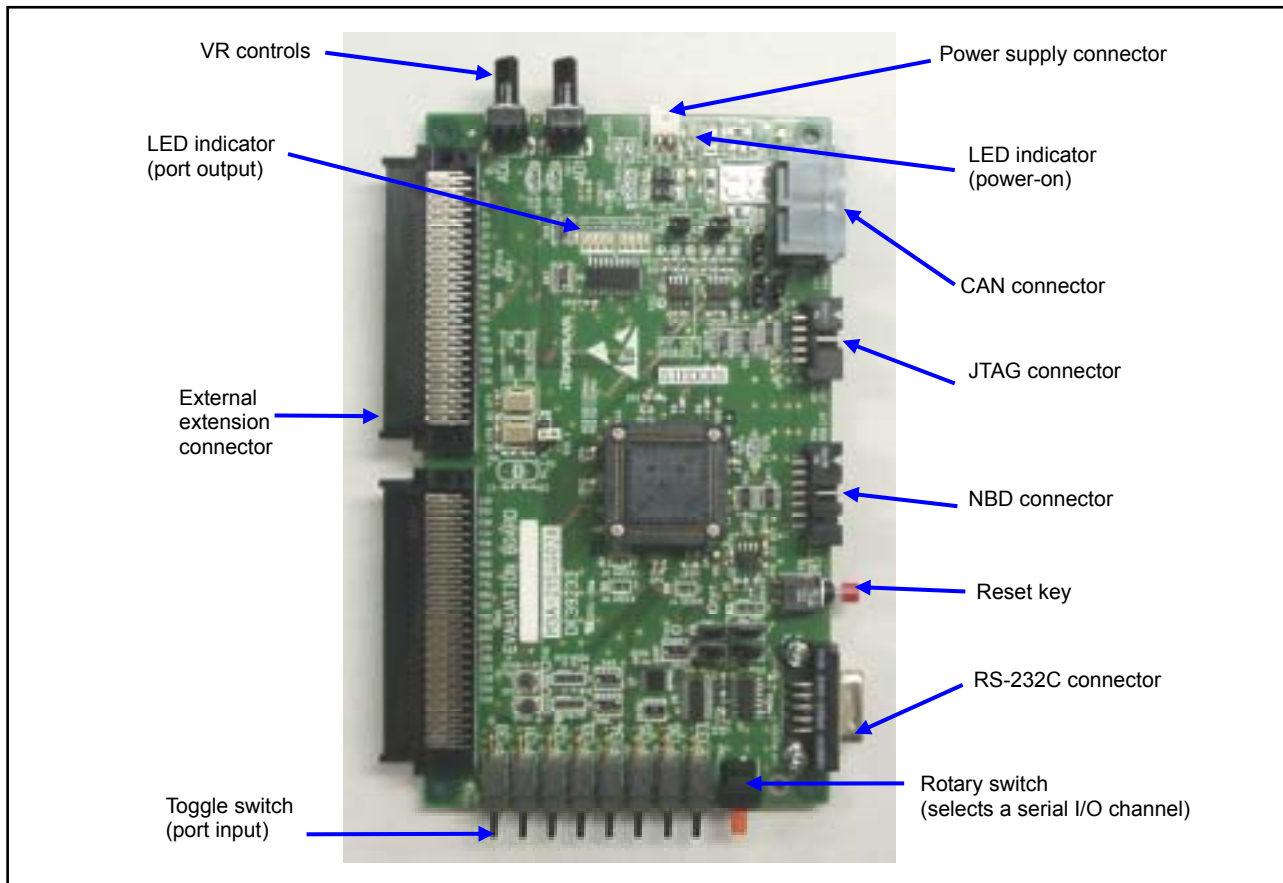


Figure 1.1 Photograph of the M3A-2154G02A



## 1.2 External View

An external view of the M3A-2154G02A is shown below.

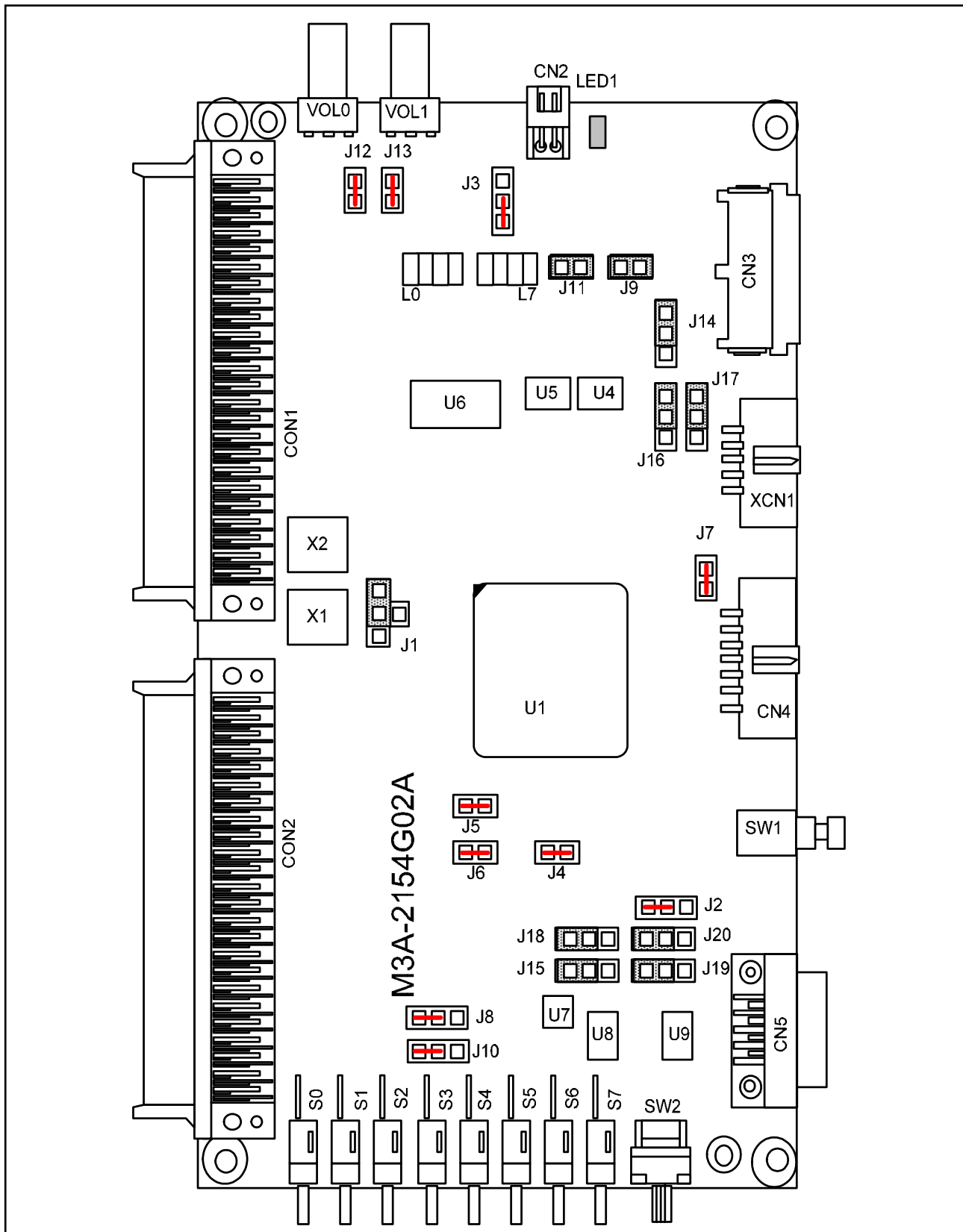


Figure 1.2 External View of the M3A-2154G02A

## 1.3 Block Diagram

A block diagram of the M3A-2154G02A is shown below.

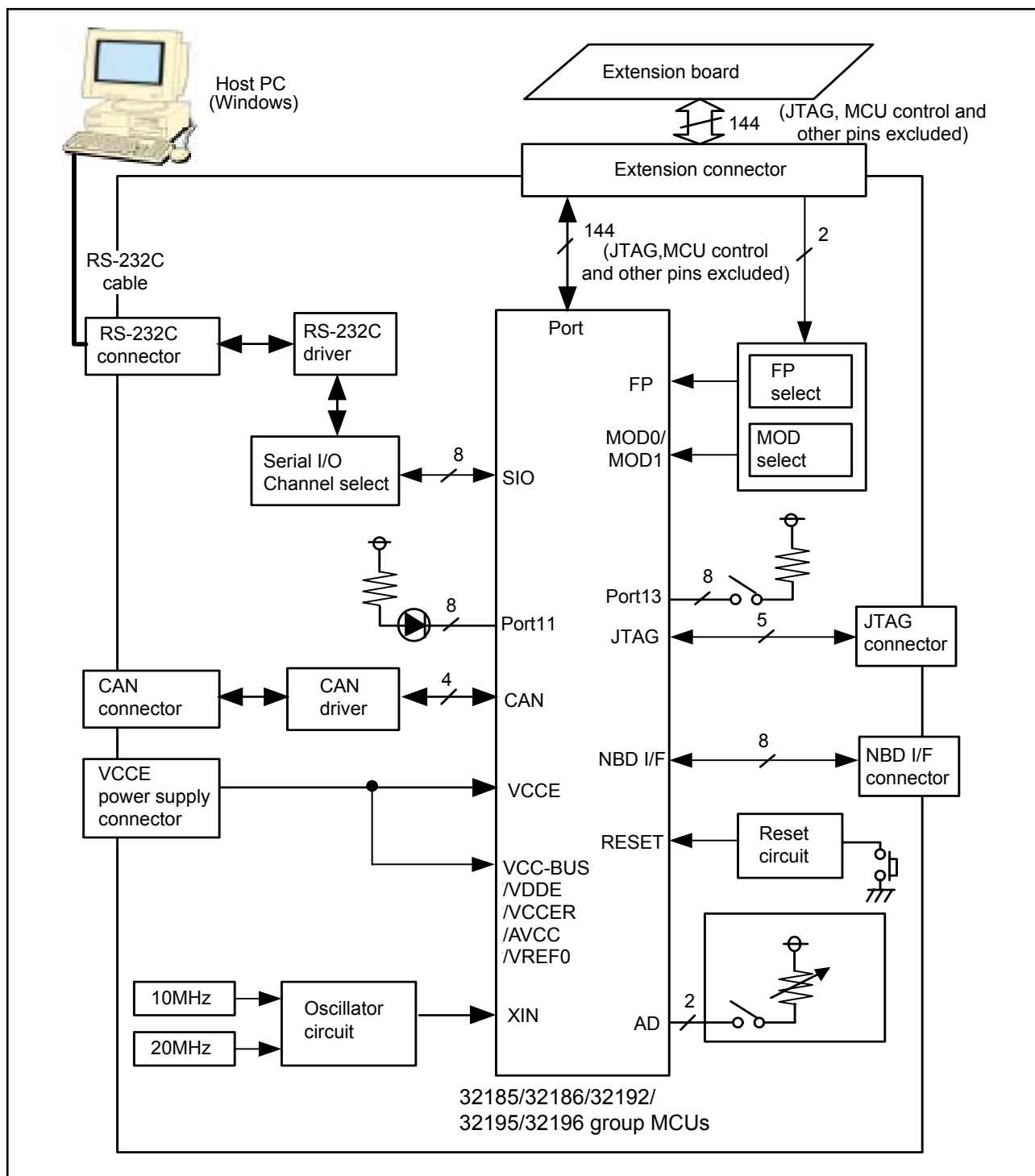


Figure 1.3 Block Diagram of the M3A-2154G02A

## 1.4 Specifications of the Evaluation Board

### 1.4.1 Electrical Characteristics

Table 1.3 Electrical Characteristics

Symbol	Parameter	Rated Value
VCCE,VCC-BUS	Power supply voltage	4.75 V to 5.25 V
Tstr	Storage ambient temperature	0°C to 60°C
Topr	Operating ambient temperature	5°C to 35°C

Note: Operating conditions require that no dewdrops and corrosive gas be present.

### 1.4.2 Functional Characteristics

Table 1.4 Functional Characteristics

Item		M3A-2154G02A				
CPU	Group MCU name	32185	32186	32192	32195	32196
	Clock input	10MHz		20MHz		
	CPU clock	80MHz		160MHz		
Memory	Flash memory	512KB	1MB	1MB	512KB	1MB
	SRAM	32KB	64KB	176KB	32KB	64KB
RS-232C interface		Comes standard with a 9-pin Dsub connector (CN5) for serial communication with the host PC (Windows)				
JTAG interface		Comes standard with a 10-pin JTAG connector for Renesas SDI (XCN1)				
NBD interface		Comes standard with a 14-pin NBD connector (CN4)				
CAN interface		Comes standard with a 2-channel connector for CAN communication (CN3), a CAN-to-Dsub connector (9-pin) conversion cord included				
Power supply	VCCE	Power supply, Connector (CN2)				
	VCC-BUS	Power supply for bus control pin, Connector (CN1)				
	LED	Illuminates in red when powered on (LED1)				
General-purpose output		LED indicators (L0–L7), CPU ports (P110–P117)				
General-purpose input		Toggle switches (S0–S7), CPU ports (P130–P137)				
Reset		Reset switch (SW1), reset input (red pushbutton) <b>*Please be careful to configure a reset circuit according to your system.</b>				
Serial I/O		Rotary switch (SW2), which selects one of four serial I/O channels				
Analog input		VR controls (VOL0, VOL1) Connects these VR controls with AD0IN0 and AD0IN1 to use them to control inputs on ports				
Extension		Extension connectors (CON1, CON2)				



Table 2.1 Configuration of the Power Supply

Connector	Power Supply	Jumper			Description
		Name	Condition		
CN1	VCC-BUS	J3	Shorted between 1–2	Default	Power supply from VCCE (CN2)
			Shorted between 2–3		Power supply from VCC-BUS (CN1)
CN2	VCCE	—	—	—	VCCE power supply
—	VCCER	J4	Shorted between 1–2	Default (Note1)	Power supply from VCCE
—	AVCC0	J5	Shorted between 1–2	Default	Power supply from VCCE
—	VREF0	J6	Shorted between 1–2	Default	Power supply from AVCC0
—	VDDE	J7	Shorted between 1–2	Default	Power supply from VCCE

Note1: Case of opened between 1-2, power supply from VCCE is stopped.

Case that 3.3 V power supply is inputted to VCCER by using 3.3 V generated circuit on board, the following items should be prepared by the user.

- U3: regulator
- D1,D2: diode
- C4,C5: capacitor

Note: The J3, J4, J5, J6 and J7 jumpers are shorted by pattern wiring on the reverse side of printed Circuit board.

Case of setting the condition except for default, setting the jumper is required after cutting the pattern for default condition by referring to the chapter **3.8 Setting jumper by cutting pattern**.

## 2.2 FP Select Circuit

The FP select circuit is used for reprogramming the internal flash memory of the M32R/ECU. This circuit is configured in such a way that FP is switched from the EXTFP signal of extension connector (CON2) by using a jumper (J10).

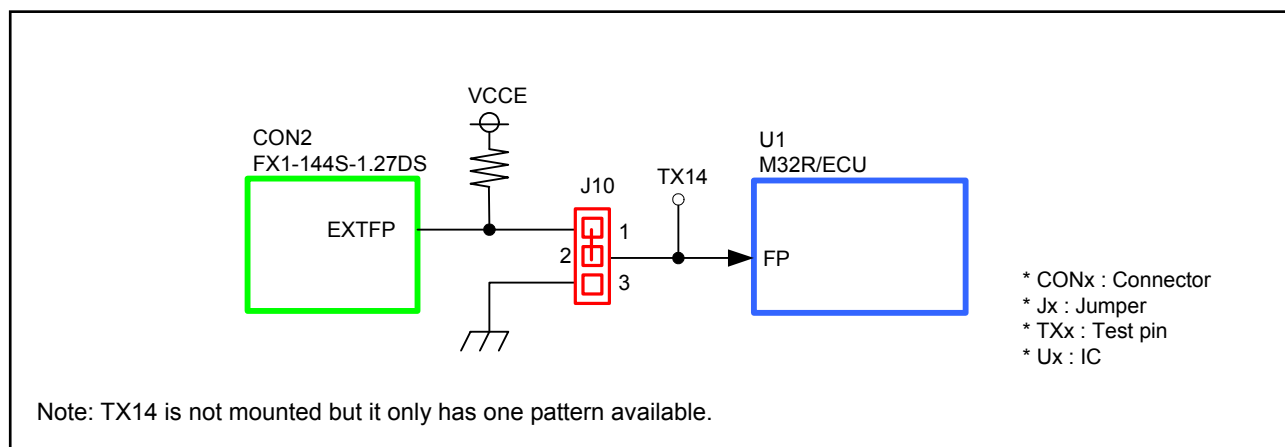


Figure 2.2 FP Select Circuit

Table 2.2 FP Select Circuit (Jumper)

Name	Condition		Description
J10	Shorted between 1–2	Default	Enables reprogramming the mounted M32R/ECU's internal flash
	Shorted between 2–3		Disables reprogramming the mounted M32R/ECU's internal flash
	Open		Unusable

Note: The J10 jumper is shorted by pattern wiring on the reverse side of printed circuit board.  
Case of setting the condition except for default, setting the jumper is required after cutting the pattern for default condition by referring to the chapter 3.8 **Setting jumper by cutting pattern**.

## 2.3 MOD Select Circuit

This circuit is used to set operation modes of the M32R/ECU. The MOD0 power supply is configured in such a way that MOD0 is switched from the EXTMOD0 signal of extension connector (CON2) by using a jumper (J8).

The MOD1 power supply defaults to 0 V. The MOD2 power supply is fixed to 0 V.

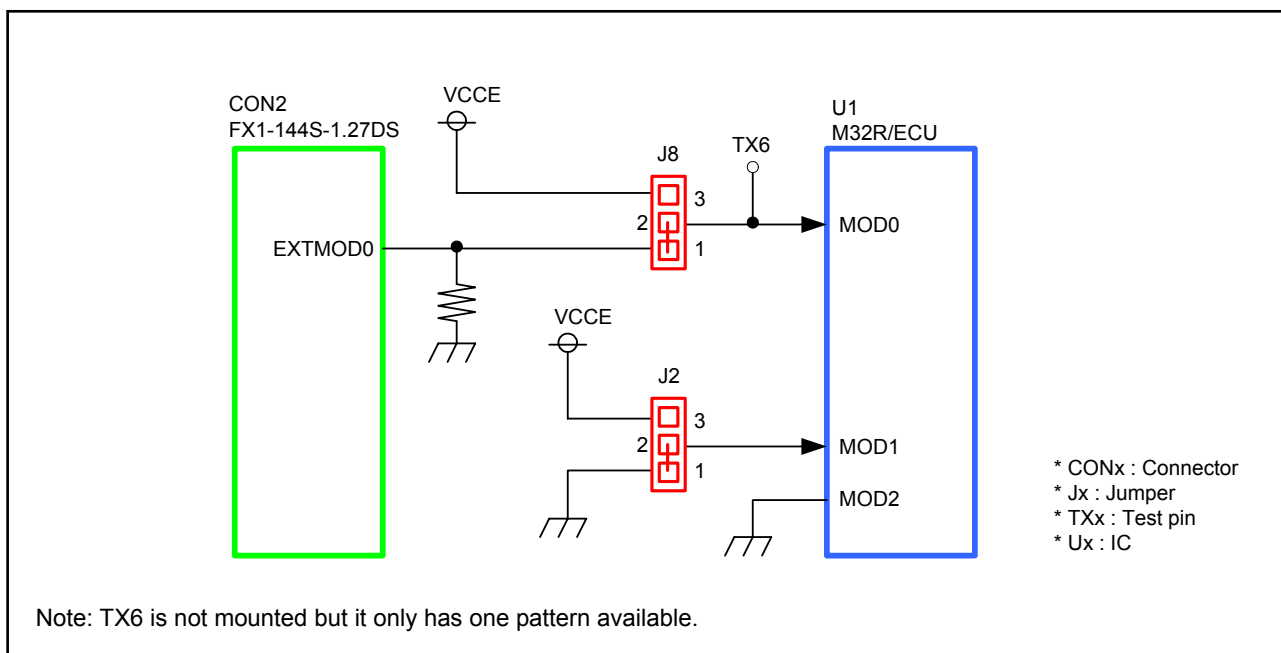


Figure 2.3 MOD Select Circuit

Table 2.3 Operation Mode Settings

MOD0	MOD1	MOD2	Description
0	0	0	<ul style="list-style-type: none"> <li>When flash reprogramming is disabled: Single-chip mode</li> <li>When flash reprogramming is enabled: Flash rewrite + single-chip mode</li> </ul>
1	0	0	<ul style="list-style-type: none"> <li>When flash reprogramming is disabled: Processor mode</li> <li>When flash reprogramming is enabled: Flash rewrite from boot ROM + single-chip mode</li> </ul>
0	1	0	External extension mode
1	1	0	Settings inhibited

Table 2.4 MOD Select Circuit (Jumper)

Name	Condition		Description
J8	Shorted between 1–2	Default	MOD0 is controlled by EXTMOD0 or is set to 0 unless it is controlled by EXTMOD0
	Shorted between 2–3		Sets MOD0 to 1
J2	Shorted between 1–2	Default	Sets MOD1 to 0
	Shorted between 2–3		Sets MOD1 to 1

Note: The J2 and J8 jumpers are shorted by pattern wiring on the reverse side of printed circuit board.

Case of setting the condition except for default, setting the jumper is required after cutting the pattern for default condition by referring to the chapter 3.8 **Setting jumper by cutting**

## 2.4 Serial I/O Interface

The evaluation board is interfaced to the host PC (Windows) through its RS-232C by using SIO of the M32R/ECU. Of the RS-232C control signals, only TXD and RXD are used for connection to the host PC (Windows). The unused CTS and RTS are directly-coupled to configure a loop-back. The unused DSR and DTR also are configured in a similar manner.

The serial I/O interface is configured in such a way that only one serial I/O channel can be used at a time.

Any of the four channels 0–3 can be selected using a rotary switch.

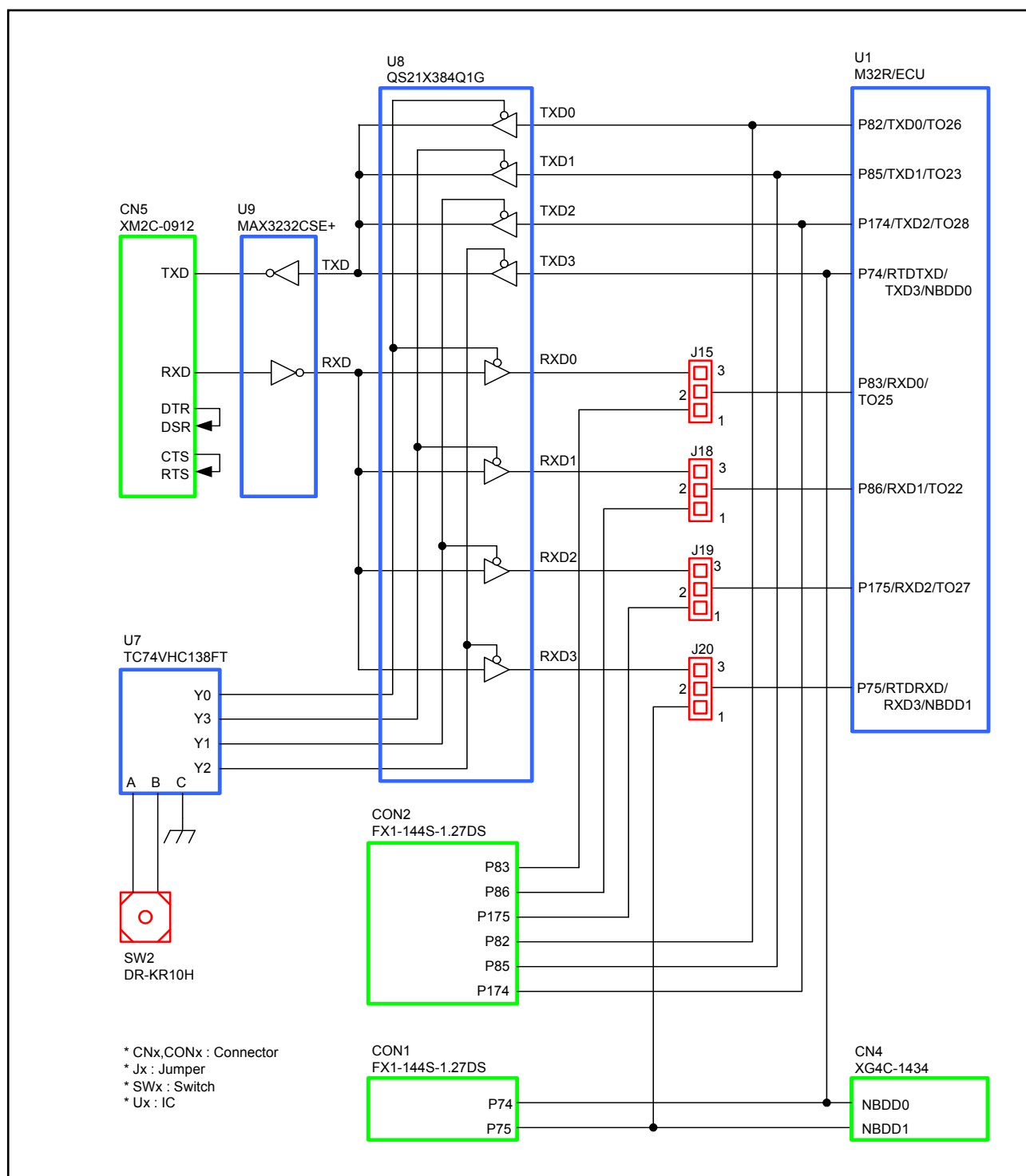


Figure 2.4 Serial I/O Interface



Table 2.5 Channel Selection by a Rotary Switch

Rotary switch position	SIO Selected channel
0	SIO0
1	SIO1
2	SIO2
3	SIO3
4	SIO0
5	SIO1
6	SIO2
7	SIO3
8	SIO0
9	SIO1

Table 2.6 Serial I/O Interface (Jumper)

Name	Condition		Description
J15	Shorted between 1–2	Default	Connects P83/RXD0/TO25 to the extension connector (CON2)
	Shorted between 2–3		Uses the RXD0 function in RS-232C
J18	Shorted between 1–2	Default	Connects P86/RXD1/TO22 to the extension connector (CON2)
	Shorted between 2–3		Uses the RXD1 function in RS-232C
J19	Shorted between 1–2	Default	Connects P175/RXD2/TO27 to the extension connector (CON2)
	Shorted between 2–3		Uses the RXD2 function in RS-232C
J20	Shorted between 1–2	Default	Connects P75/RTDRXD/RXD3/NBDD1 to the extension connector (CON1)
	Shorted between 2–3		Uses the RXD3 function in RS-232C

Note: The jumpers J15, J18, J19 and J20 are shorted by jumper parts.

Table 2.7 RS-232C Connector Pin Assignments

Connector Name	Pin No	Signal Name	Description
CN5	1	DCD	Unused
	2	RXD	Received data
	3	TXD	Transmitted data
	4	DTR	Connects to the DSR pin
	5	SG	Ground
	6	DSR	Connects to the DTR pin
	7	RTS	Connects to the CTS pin
	8	CTS	Connects to the RTS pin
	9	RI	Unused

## 2.5 Oscillator Circuit

The oscillator circuit can be selected from three options by using the jumper J1: a surface mount-type 20 MHz crystal oscillator module, a surface mount-type 10 MHz crystal oscillator module or a crystal resonator. By default, the surface mount-type 20 MHz crystal oscillator module is selected.

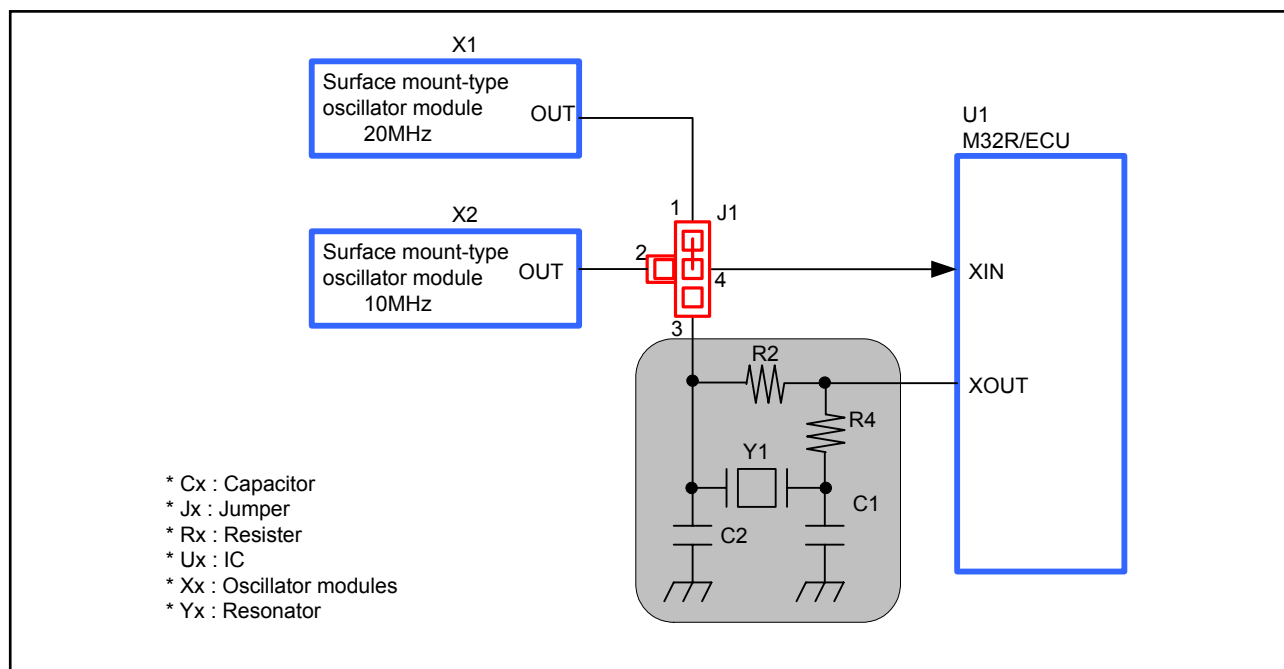


Figure 2.5 Oscillator Circuit

Note: The shaded sections in the above diagram have only patterns available. When using the resonator Y1, please be sure to add capacitors (C1, C2) and a resistor (R2, R4).

Table 2.8 Oscillator Circuit Connections (Jumper)

Name	Condition		Description
J1	Shorted between 1–4	Default	Outputs a clock from X1 (surface mount-type oscillator module)
	Shorted between 2–4	(Note1)	Outputs a clock from X2 (surface mount-type oscillator module)
	Shorted between 3–4		Outputs a clock from Y1 (resonator)

Note1: Using M32186F8VFP, the J1 jumper should be shorted between 2-4.

The LED indicators (L0–L7) are used to indicate the status of the M32R/ECU ports P110–P117.

Figure 2.6 LED Indicator Block for the General-purpose Output Ports

LED Name	Corresponding M32R/ECU Port	ON Condition	Color
L0	P110	High	Red
L1	P111	High	Red
L2	P112	High	Red
L3	P113	High	Red
L4	P114	High	Red
L5	P115	High	Red
L6	P116	High	Red
L7	P117	High	Red

## 2.7 General-purpose Input Port Control Circuit

The general-purpose input port control circuit is used to control the status of the M32R/ECU ports P130–P137 by using toggle switches (S0–S7). For the settings of jumpers J16 and J17, see the Section 2.9 CAN Interface.

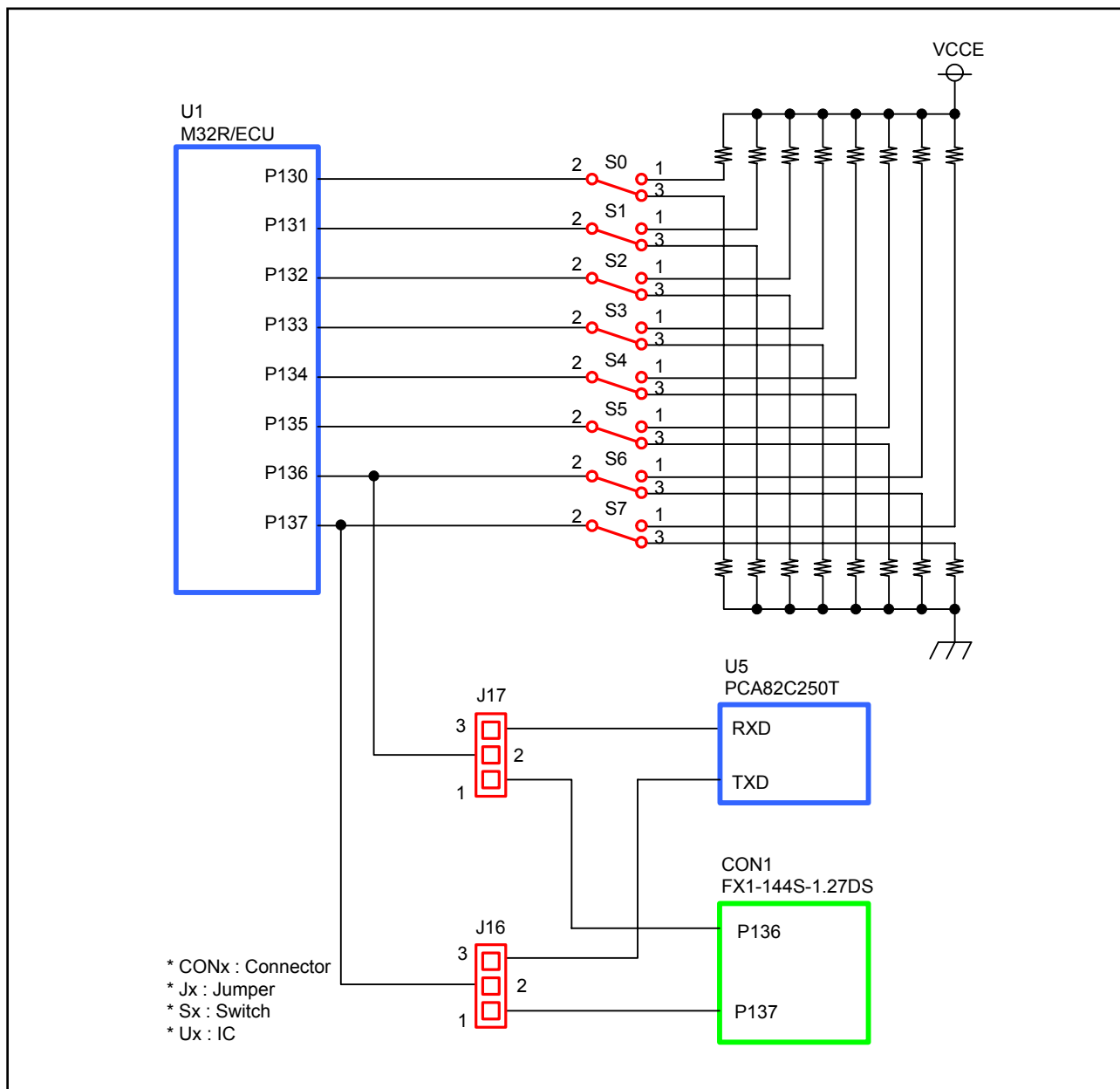


Figure 2.7 General-purpose Input Port Control Circuit

Table 2.10 Relationship Between  
Toggle Switches and Ports

Toggle Switch Name	Corresponding M32R/ECU Port
S0	P130
S1	P131
S2	P132
S3	P133
S4	P134
S5	P135
S6	P136
S7	P137

Table 2.11 Toggle Switch Positions

Lever Direction	Port Input Level
Up	High
Middle	Open
Down	Low

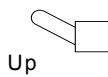
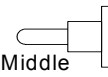
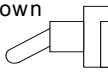
Lever direction			
Port input level	H	Open	L

Figure 2.8 Toggle Switch Positions

## 2.8 Analog Port Input Control Circuit

The analog port input control circuit is used to control the status of the M32R/ECU analog ports AD0IN0 and AD0IN1 by using VR controls VOL0 and VOL1.

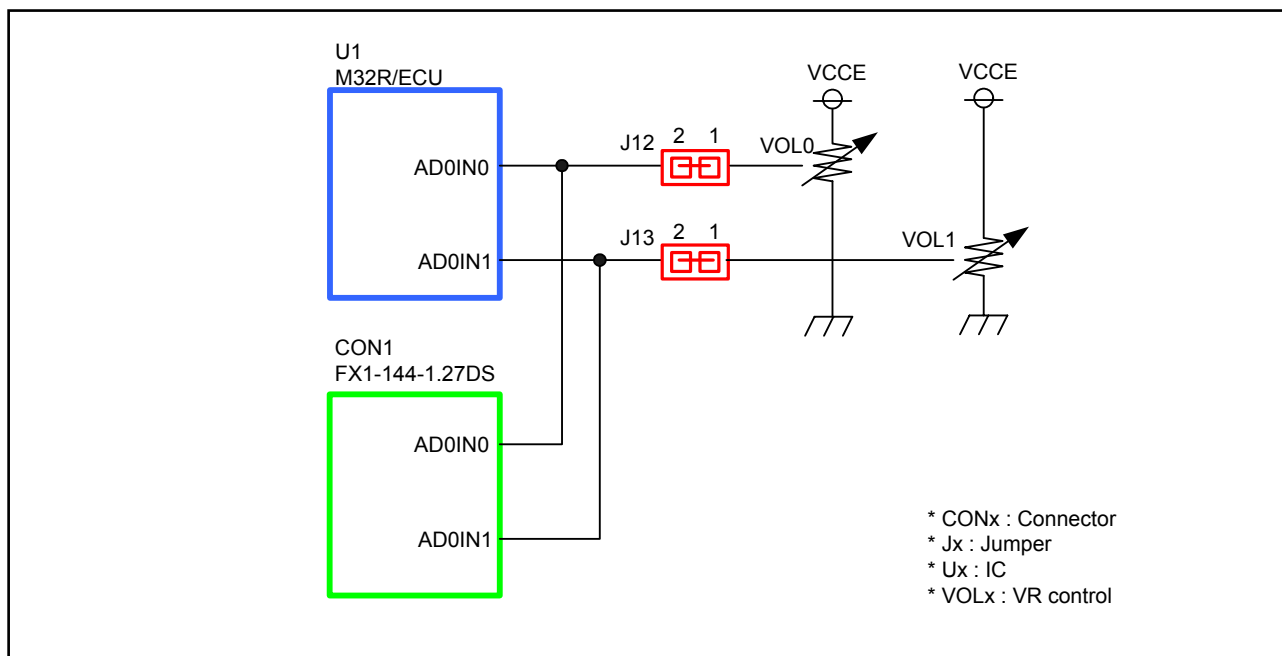


Figure 2.9 Analog Port Input Control Circuit

Table 2.12 Analog Port Input Control (Jumper)

Name	Condition		Description
J12	Shorted between 1–2	Default	Uses VR control (VOL0)
	Open between 1–2		Does not use VR control (VOL0)
J13	Shorted between 1–2	Default	Uses VR control (VOL1)
	Open between 1–2		Does not use VR control (VOL1)

Note: The J12 and J13 jumpers are shorted by pattern wiring on the reverse side of printed circuit board.  
Case of setting the condition except for default, setting the jumper is required after cutting the pattern for default condition by referring to the chapter 3.8 **Setting jumper by cutting pattern**.

## 2.9 CAN Interface

The evaluation board is interfaced to a CAN-mounted system by using the internal CAN functions of the M32R/ECU.

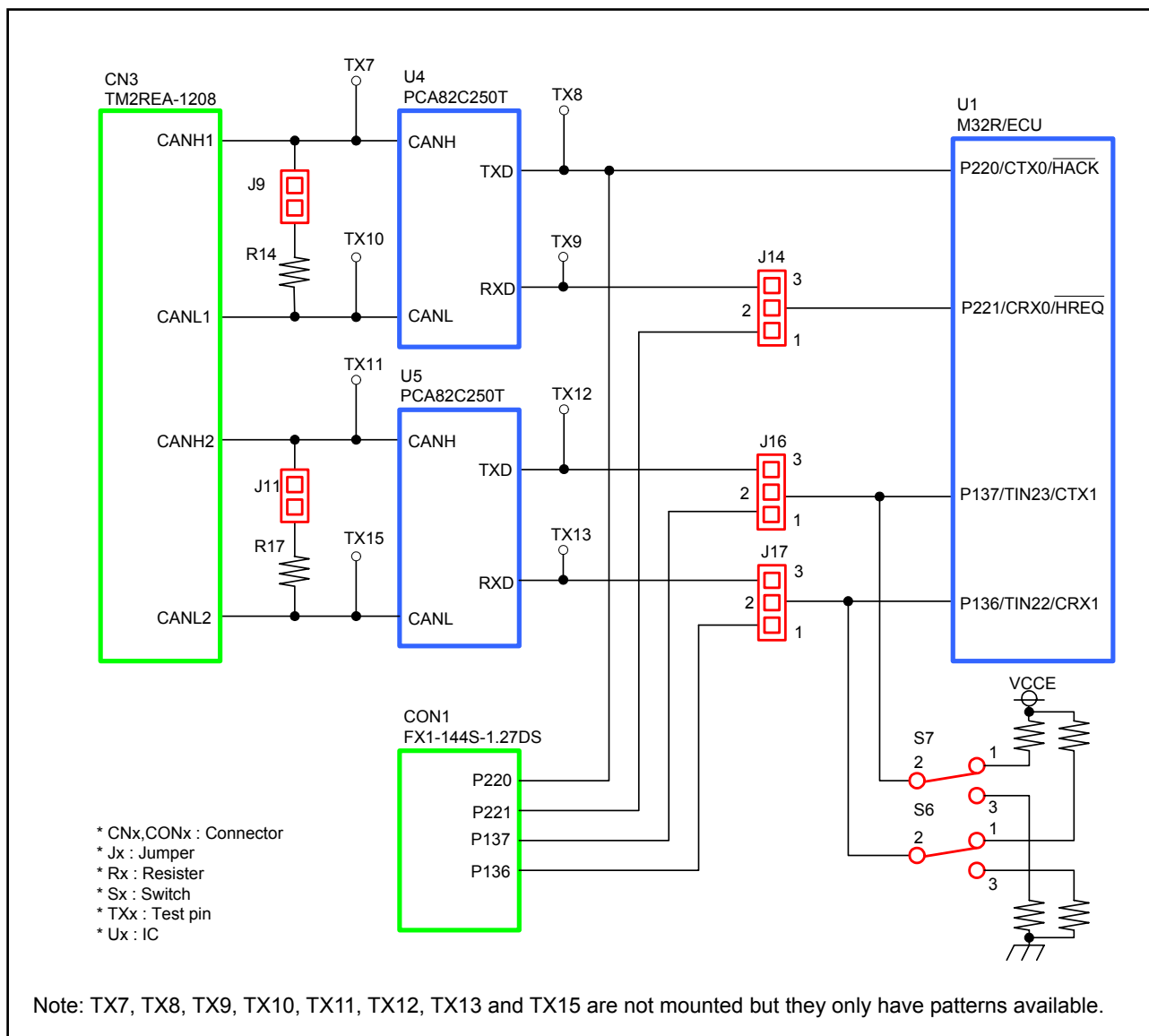


Figure 2.10 Interface with a CAN-mounted System

Table 2.13 CAN Connector Pin Assignments

Connector Name	Pin No	Signal Name	Description
CN3	1	CANH1	High-level CAN0 input/output port
	2	CANL1	Low-level CAN0 input/output port
	3	CANH2	High-level CAN1 input/output port
	4	CANL2	Low-level CAN1 input/output port
	5	GND	Ground
	6	—	Unused
	7	GND	Ground
	8	—	Unused

- (1) How to connect the CAN connector

The jumpers J14, J16 and J17 allow selecting the destinations to which the CAN communication pins (CTX, CRX) are connected.

Table 2.14 Jumper Usage Conditions (J14, J16 and J17)

Name	Condition		Description
J14	Shorted between 1–2	Default	Connects P221/CRX0/HREQ to the extension connector (CON1)
	Shorted between 2–3		Uses the CRX0 function in CAN connector CN3
J16	Shorted between 1–2	Default	Connects P137/TIN23/CTX1 to the extension connector (CON1)
	Shorted between 2–3		Uses the CTX1 function in CAN connector CN3
J17	Shorted between 1–2	Default	Connects P136/TIN22/CRX1 to the extension connector (CON1)
	Shorted between 2–3		Uses the CRX1 function in CAN connector CN3

Note: The jumpers J14, J16 and J17 are shorted by jumper parts.

- (2) How to select the terminating resistor connection

The jumpers J9 and J11 allow the terminating resistors to be used in the CAN transmission path.

Table 2.15 Selecting the Terminating Resistor Connection (J9, J11)

Name	Condition		Description
J9	Shorted between 1–2	Default	Uses the CAN0 terminating resistor mounted on-board
	Open between 1–2		Does not use the CAN0 terminating resistor mounted on-board
J11	Shorted between 1–2	Default	Uses the CAN1 terminating resistor mounted on-board
	Open between 1–2		Does not use the CAN1 terminating resistor mounted on-board

Note: The jumpers J9 and J11 are shorted by jumper parts.



## 2.10 JTAG/NBD Interface

The JTAG connector for Renesas SDI, XCN1 consists of the 2.54-mm contact pitch XG4C-1034 made by Omron Corporation. The NBD connector, CN4 consists of the 2.54-mm contact pitch XG4C-1434 made by Omron Corporation.

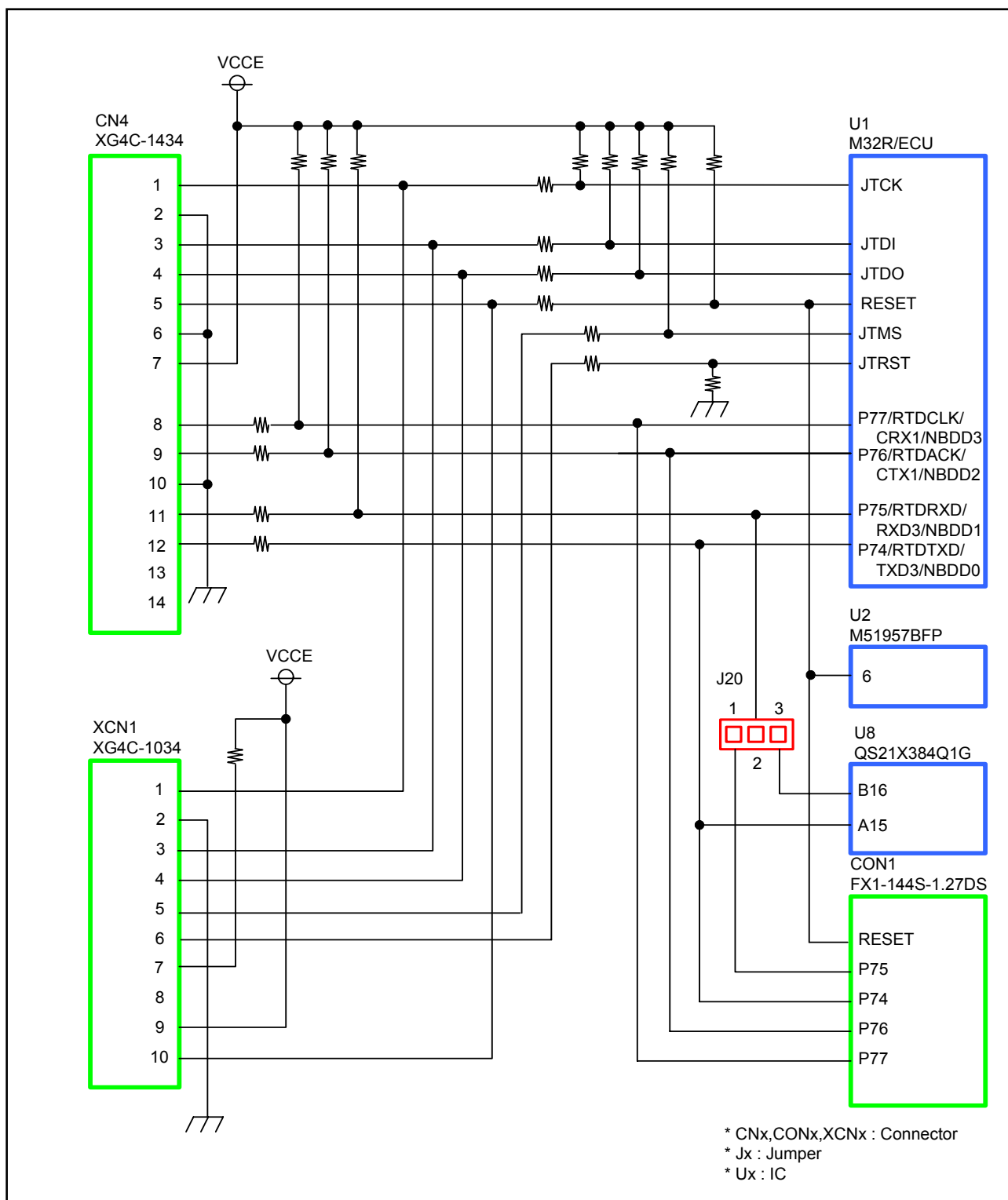


Figure 2.11 JTAG/NBD Interface

Table 2.16 JTAG Interface Connector Pin Assignments

Connector Name	Pin No	Signal Name	Description
XCN1	1	JTCK	Test clock
	2	GND	Ground
	3	JTDI	Test data input
	4	JTDO	Test data output
	5	JTMS	Test mode select
	6	JTRST	Test reset
	7	JDBI	Break request
	8	VCCE	Power supply
	9	JVCC	User system power supply monitor
	10	RESET	Reset

Table 2.17 NBD Interface Connector Pin Assignments

Connector Name	Pin No.	Signal Name	Description
CN4	1	NBDCLK	Synchronizing clock input
	2	GND	Ground
	3	NBDSYNC#	Top of data input
	4	NBDEVNT#	Event output
	5	RESET	Reset
	6	GND	Ground
	7	JVCC	Power supply
	8	NBDD3	Command/Address/Data
	9	NBDD2	Command/Address/Data
	10	GND	Ground
	11	NBDD1	Command/Address/Data
	12	NBDD0	Command/Address/Data
	13	NC	Unused
	14	NC	Unused

### 3. Reference Data

#### 3.1 Jumper and Test Pin Lists

##### 3.1.1 Jumpers

Table 3.1 Jumper List

Jumper No.	Default	Description
J1	Shorted between 1–4	Outputs a clock from X1 (surface mount-type oscillator module)
J2	Shorted between 1–2	Sets MOD1 to 0
J3	Shorted between 1–2	Power supply from VCCE
J4	Shorted between 1–2	Power supply from VCCE
J5	Shorted between 1–2	Power supply from VCCE
J6	Shorted between 1–2	Power supply from AVCC0
J7	Shorted between 1–2	Power supply from VCCE
J8	Shorted between 1–2	MOD0 is controlled by EXTMOD0 or is set to 0 unless it is controlled by EXTMOD0
J9	Shorted between 1–2	Uses the CAN0 terminating resistor mounted on-board
J10	Shorted between 1–2	Enables reprogramming the mounted M32R/ECU's internal flash
J11	Shorted between 1–2	Uses the CAN1 terminating resistor mounted on-board
J12	Shorted between 1–2	Uses the VR control (VOL0)
J13	Shorted between 1–2	Uses the VR control (VOL1)
J14	Shorted between 1–2	Connects P221/CRX0/HREQ to the extension connector (CON1)
J15	Shorted between 1–2	Connects P83/RXD0/TO25 to the extension connector (CON2)
J16	Shorted between 1–2	Connects P137/TIN23/CTX1 to the extension connector (CON1)
J17	Shorted between 1–2	Connects P136/TIN22/CRX1 to the extension connector (CON2)
J18	Shorted between 1–2	Connects P86/RXD1/TO22 to the extension connector (CON2)
J19	Shorted between 1–2	Connects P175/RXD2/TO27 to the extension connector (CON2)
J20	Shorted between 1–2	Connects P75/RTDRXD/RXD3/NBDD1 to the extension connector (CON1)

##### 3.1.2 Test Pins

Table 3.2 List of Test Pins

Test Pin No.	Signal Name	Test Pin No.	Signal Name
TX1	VCC-BUS	TX10	CANL1
TX 2	VCCE	TX 11	CANH2
TX 3	GND	TX 12	CTX1
TX 4	GND	TX 13	CRX1
TX 5	RESET	TX 14	FP
TX 6	MOD0	TX 15	CANL2
TX 7	CANH1	TX 16	TXD1
TX 8	CTX0	TX17	P87
TX 9	CRX0	TX 18	VREF0

## 3.2 Extension Connectors CON1 and CON2

### 3.2.1 Pin Assignments of the Extension Connector CON1

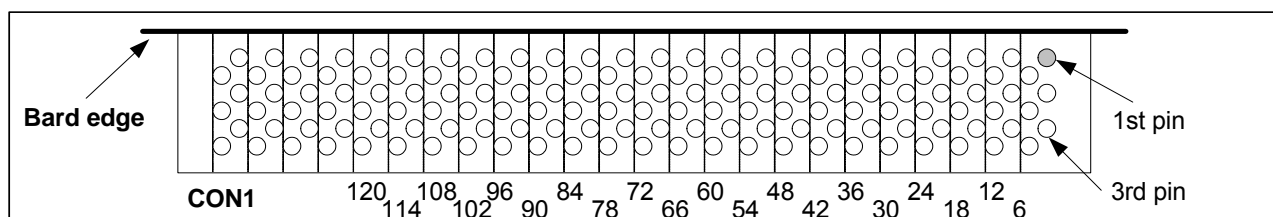


Figure 3.1 CON1 Connector Pin Assignments (View from Side of Mounted Items)

Table 3.3 CON1 Connector Pin Assignments

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1	AVCC	31	NC	61	VCCE	91	NC
2	GND	32	NC	62	GND	92	P124
3	VCCE	33	GND	63	AVCC0	93	P125
4	P150	34	NC	64	VREF0	94	P126
5	NC	35	RESET	65	AD0IN0	95	P127
6	NC	36	NC	66	AD0IN1	96	NC
7	P153	37	NC	67	AD0IN2	97	NC
8	NC	38	NC	68	AD0IN3	98	NC
9	NC	39	NC	69	AD0IN4	99	NC
10	NC	40	NC	70	AD0IN5	100	NC
11	NC	41	NC	71	AD0IN6	101	NC
12	NC	42	NC	72	AD0IN7	102	NC
13	NC	43	NC	73	GND	103	NC
14	NC	44	P74	74	AD0IN8	104	NC
15	NC	45	P75	75	AD0IN9	105	NC
16	P130	46	P76	76	AD0IN10	106	NC
17	P131	47	P77	77	AD0IN11	107	NC
18	P132	48	NC	78	AD0IN12	108	NC
19	P133	49	NC	79	AD0IN13	109	NC
20	P134	50	NC	80	AD0IN14	110	NC
21	P135	51	NC	81	AD0IN15	111	NC
22	P136	52	NC	82	P61	112	P110
23	P137	53	P100	83	P62	113	P111
24	P220	54	P101	84	P63	114	P112
25	P221	55	P102	85	SBI	115	P113
26	NC	56	P103	86	GND	116	P114
27	NC	57	P104	87	GND	117	P115
28	VCCE	58	P105	88	GND	118	P116
29	GND	59	P106	89	VCCE	119	P117
30	NC	60	P107	90	GND	120	P97

Note: NC denotes "Not Connected."

Pin Nos. 121 to 144 are not connected.

### 3.2.2 Pin Assignments of the Extension Connector CON2

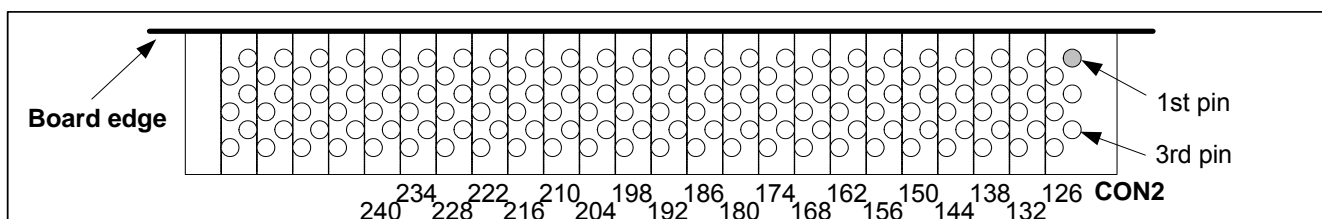


Figure 3.2 CON2 Connector Pin Assignments (View from Side of Mounted Items)

Table 3.4 CON2 Connector Pin Assignments

Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name	Pin No.	Signal Name
1 (121)	P96	31 (151)	NC	61 (181)	P174	91 (211)	P1
2 (122)	P95	32 (152)	NC	62 (182)	P175	92 (212)	P0
3 (123)	P94	33 (153)	VCC-BUS	63 (183)	NC	93 (213)	GND
4 (124)	P93	34 (154)	VCCE	64 (184)	NC	94 (214)	P73
5 (125)	VCCE	35 (155)	GND	65 (185)	NC	95 (215)	P72
6 (126)	GND	36 (156)	NC	66 (186)	NC	96 (216)	P71
7 (127)	VCC-BUS	37 (157)	NC	67 (187)	FP	97 (217)	P70
8 (128)	P27	38 (158)	NC	68 (188)	MOD0	98 (218)	P43
9 (129)	P26	39 (159)	NC	69 (189)	NC	99 (219)	P42
10 (130)	P25	40 (160)	NC	70 (190)	NC	100 (220)	P41
11 (131)	P24	41 (161)	NC	71 (191)	GND	101 (221)	VCC-BUS
12 (132)	P23	42 (162)	NC	72 (192)	NC	102 (222)	GND
13 (133)	P22	43 (163)	NC	73 (193)	NC	103 (223)	NC
14 (134)	P21	44 (164)	NC	74 (194)	GND	104 (224)	NC
15 (135)	P20	45 (165)	NC	75 (195)	VCCE	105 (225)	NC
16 (136)	GND	46 (166)	NC	76 (196)	VCC-BUS	106 (226)	NC
17 (137)	P37	47 (167)	NC	77 (197)	P17	107 (227)	NC
18 (138)	P36	48 (168)	NC	78 (198)	P16	108 (228)	NC
19 (139)	P35	49 (169)	NC	79 (199)	P15	109 (229)	NC
20 (140)	P34	50 (170)	NC	80 (200)	P14	110 (230)	NC
21 (141)	P33	51 (171)	NC	81 (201)	P13	111 (231)	GND
22 (142)	P32	52 (172)	NC	82 (202)	P12	112 (232)	NC
23 (143)	P31	53 (173)	NC	83 (203)	P11	113 (233)	NC
24 (144)	P30	54 (174)	NC	84 (204)	P10	114 (234)	NC
25 (145)	P47	55 (175)	P87	85 (205)	P7	115 (235)	NC
26 (146)	P46	56 (176)	P86	86 (206)	P6	116 (236)	NC
27 (147)	P225	57 (177)	P85	87 (207)	P5	117 (237)	NC
28 (148)	P224	58 (178)	P84	88 (208)	P4	118 (238)	NC
29 (149)	P45	59 (179)	P83	89 (209)	P3	119 (239)	NC
30 (150)	P44	60 (180)	P82	90 (210)	P2	120 (240)	NC

Note: NC denotes "Not Connected."

Pin Nos. 121 to 144 are not connected.

Numbers in parentheses ( ) in the table correspond to the Pin No. on the board.

### 3.3 CAN Cable

#### (1) External View

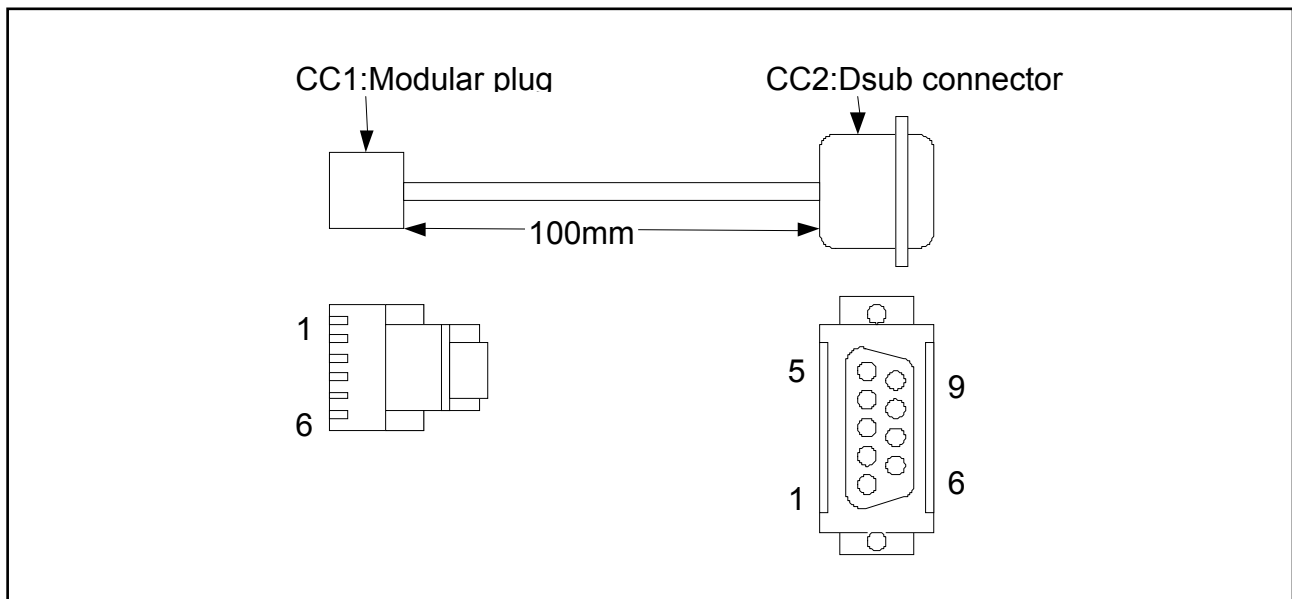


Figure 3.3 External View

#### (2) CC1 and CC2 Connections

Table 3.5 Connection Table

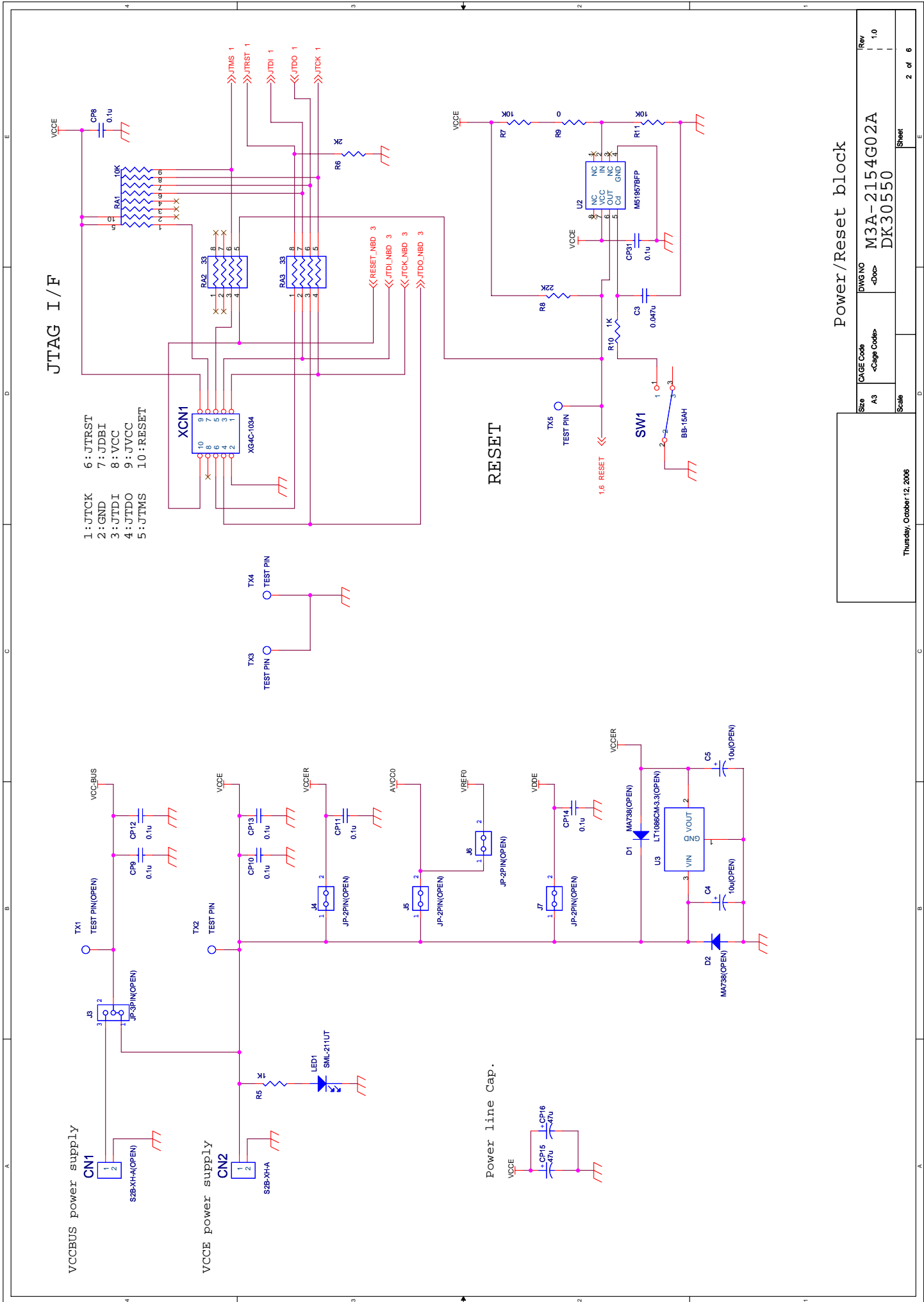
CN1			CN2	
Pin No.	Pin Name		Pin Name	Pin No.
1	—		NC	1
2	CANL (blue)		CANL	2
3	—		GND	3
4	CANH (white)		NC	4
5	GND (black)		NC	5
6	—		NC	6
			CANH	7
			NC	8
			NC	9

### 3.4 Connection Diagram

A connection diagram is provided in following pages for your reference.

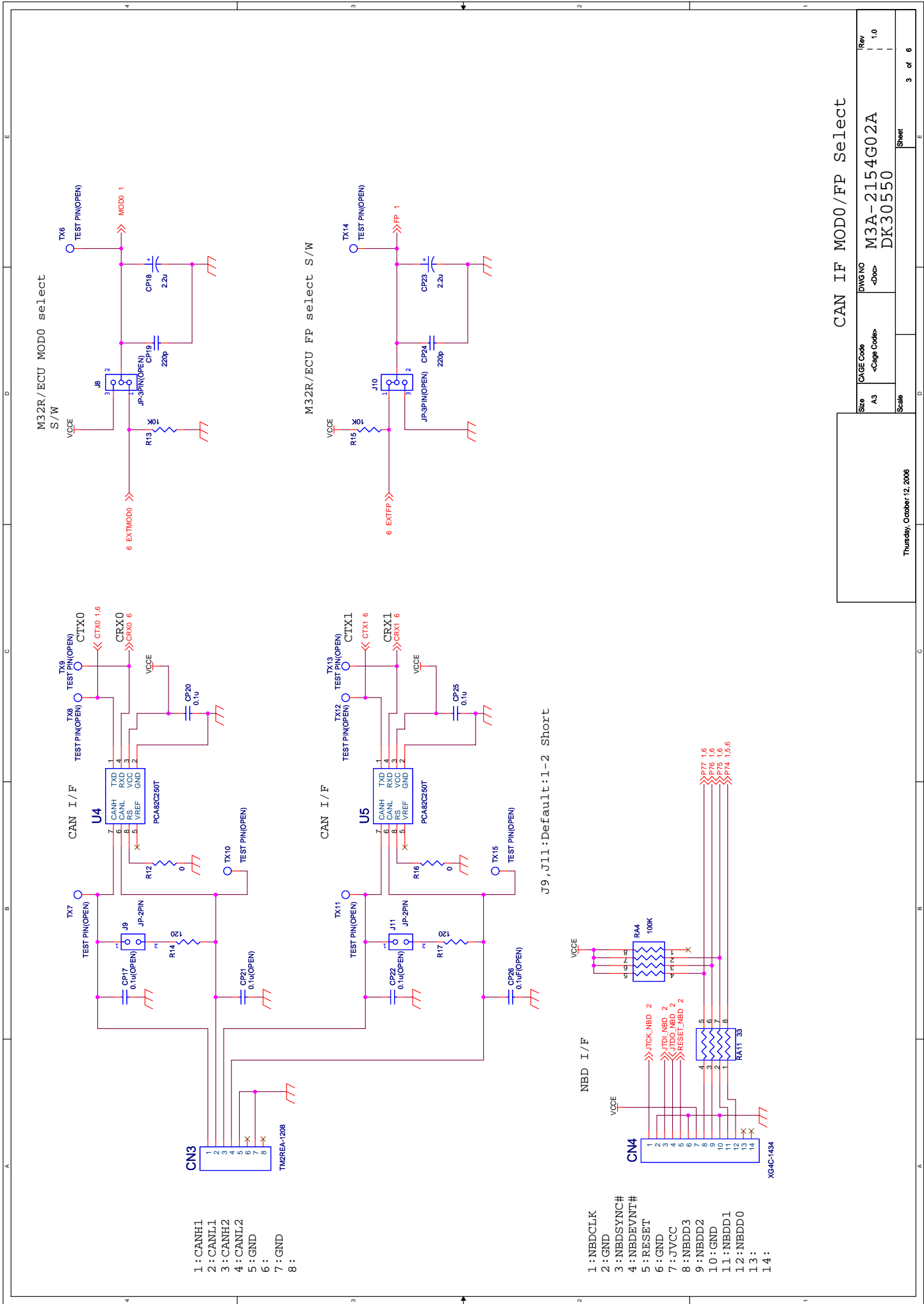




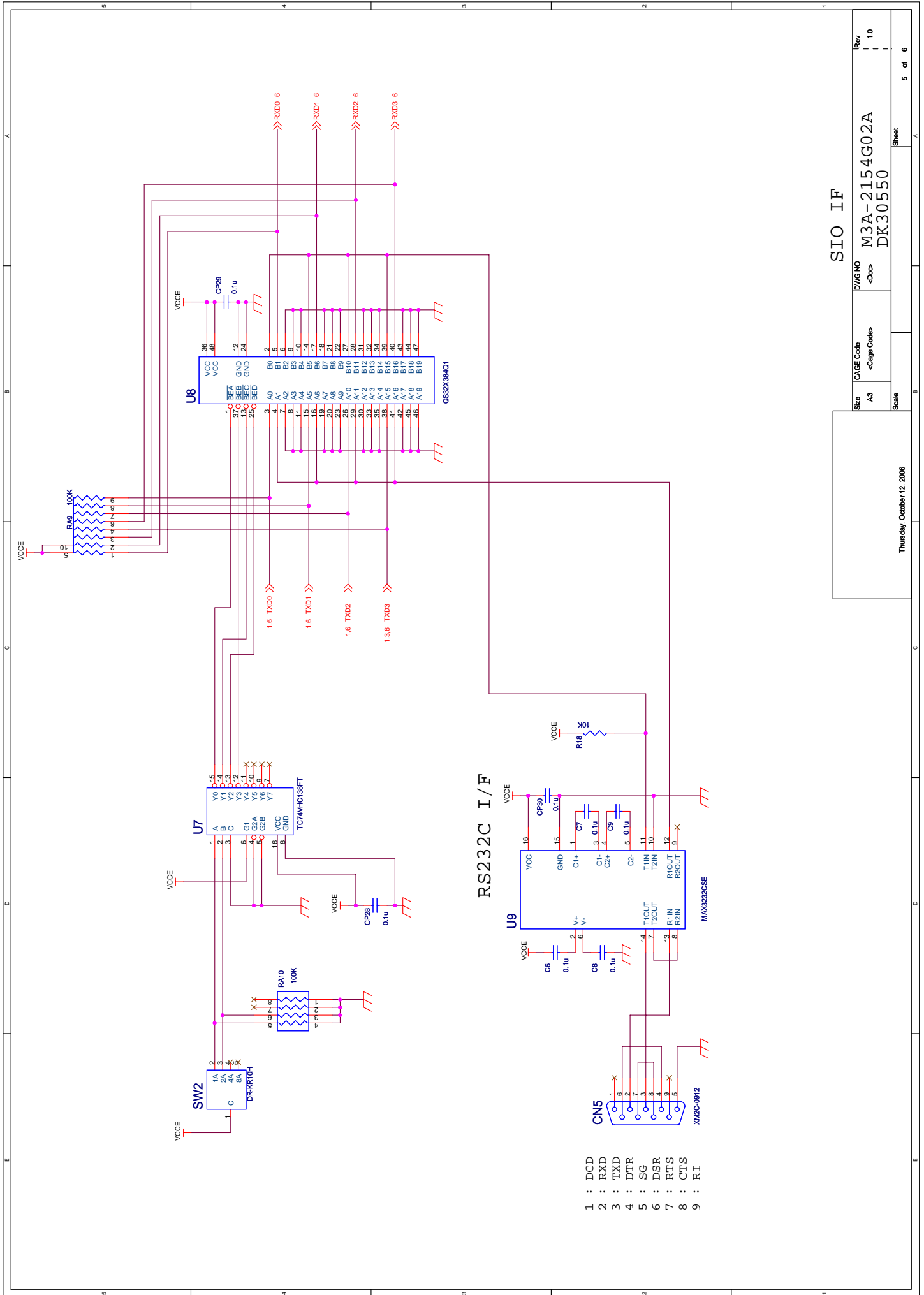


# Power/Reset block

Size		CAGE Code	DWG NO	Rev
A3		<Cage Code>	M3A-2154G02A	1.0
Scale			DK30550	
Thursday, October 12, 2006		Sheet	2 of 6	





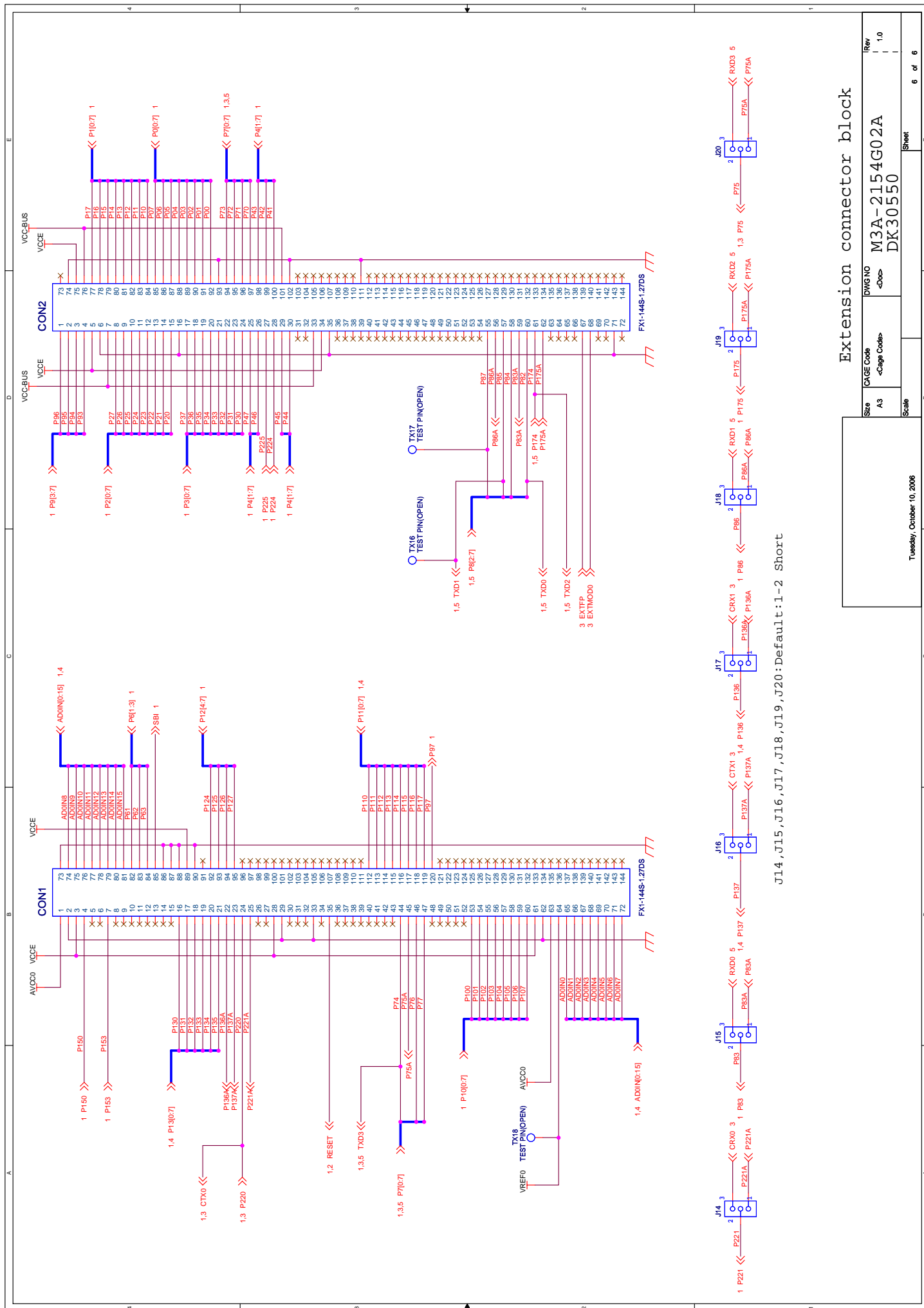


- 1 : DCD
- 2 : RXD
- 3 : TXD
- 4 : DTR
- 5 : SG
- 6 : DSR
- 7 : RTS
- 8 : CTS
- 9 : RI

RS232C I/F

SIO IF

		SIO IF			
		Size	JAGE Code	DWG NO	Rev
		A3	<Cage Code>	<Doc>	1.0
		M3A-2154G02A DK30550			
Thursday, October 12, 2006		Scale	Sheet		5 of 6
		B	A		



# Extension connector block

Size	CAGE Code	DWG NO	Rev
A3	<Cage Code>	M3A-2154G02A	1.0
Scale		DK30550	
		Sheet	6 of 6

Tuesday, October 10, 2006

J14, J15, J16, J17, J18, J19, J20: Default: 1-2 Short

### 3.5 Part List

A part list is provided in following pages for your reference.

Handling	Classification	No.	Title	Division in charge
	<b>Part List</b>	<b>PPL-M3A-2154G02A</b>	<b>M3A-2154G02A</b>	
Created		Revision		
Checked				

Item No.	Part Name		Part Specification			Required Q'ty per Unit	Supply Classification	Remarks
	Description	Part No.	Part Type Name (Drawing No.,Product Specification)	Manufacturer Name	Mounting Direction			
1	M32R/ECU#6HL	U1	M32192F8VFP	Renesas	Socket-mounted	1		
2	M32R/ECU#6HL	U1	M32186F8VFP	Renesas	Not mounted	0		Included as part
3	Microcomputer socket	U1	NQPACK144SD	Tokyo eletec	Mounted directly	1		
4	Microcomputer socket	U1	HQPACK144SD	Tokyo eletec	Mounted directly	1		
5	Reset IC	U2	M51957BFP	Renesas	Mounted directly	1		
6	Regulator	U3	LT1086CM-3.3	Linear	Not mounted	0		
7	CAN driver IC	U4, 5	PCA82C250T	Philips	Mounted directly	2		
8	LED driver IC	U6	TC74HC540AF	Toshiba	Mounted directly	1		
9	Decoder IC	U7	TC74VHC138FT	Toshiba	Mounted directly	1		
10	Bus switch IC	U8	QS32X384Q1G	IDT	Mounted directly	1		
11	RS232C driver IC	U9	MAX3232CSE+	MAXIM	Mounted directly	1		
12	Oscillator	X1	DS0751SB-20MHz	Daishinku	Mounted directly	1		
13	Oscillator	X2	DS0751SL-10MHz	Daishinku	Mounted directly	1		
14	Resonator	Y1	CSA-20MTz(20MHz)	Murata	Not mounted	0		
15	Switch (push type)	SW1	BB-15AH (right-angle type)	Nihon Kaiheiki	Mounted directly	1		
16	Operating unit for SW1	For SW1	AT-475 (red color)	Nihon Kaiheiki	Mounted directly	1		
17	Rotary switch	SW2	DR-KR10H (right-angle type)	Nihon Kaiheiki	Mounted directly	1		
Special note:			Special note:					
(1) Blank columns denote the same content as the upper row.								
(2) If two or more part type names are written for one part, the upper row has priority.								
(3) The asterisk (*) in the item No. column denotes that the rest is blank.								

Item No.	Part Name		Part Specification			Required Qty per Unit	Supply Classification	Remarks
	Description	Part No.	Part Type Name (Drawing No., Product Specification)	Manufacturer Name	Mounting Direction			
18	Switch	S0-7	A-13J2V (right-angle type)	Nihon Kaiheiki	Mounted directly	8		
19	Connector	CN1	S2B-XH-A	J.S.T. Mfg.	Not mounted	0		
20	Connector	CN2	S2B-XH-A	J.S.T. Mfg.	Mounted directly	1		
21	Connector	CN3	TM2REA-1208	Hirose	Mounted directly	1		
22	Connector	CN4	XG4C-1434	Omron	Mounted directly	1		
23	Connector	CN5	XM2C-0912	Omron	Mounted directly	1		
24	Connector	CON1,2	FX1-144S-1.27DS	Hirose	Mounted directly	2		
25	Connector	XCN1	XG4C-1034	Omron	Mounted directly	1		
26	Jumper pin (4 pins)	J1	FFC-4ASM1B	Honda Tsushin Kogyo	Mounted directly	1		
27	Jumper pin (3 pins)	J2,3,8,10	FFC-3ASM1B	Honda Tsushin Kogyo	Not mounted	0		
28	Jumper pin (3 pins)	J14-20	FFC-3ASM1B	Honda Tsushin Kogyo	Mounted directly	7		
29	Jumper pin (2 pins)	J9,11	FFC-2ASM1B	Honda Tsushin Kogyo	Mounted directly	2		
30	Jumper pin (2 pins)	J4,5,6,7,12,13	FFC-2ASM1B	Honda Tsushin Kogyo	Not mounted	0		
31	LED	LED1, L0-7	SML-211UT	Rohm	Mounted directly	9		
32	Test pin	TX1,6-18	ST-1-1	Mac-Eight	Not mounted	0		
33	Test pin	TX2-5	ST-1-1	Mac-Eight	Mounted directly	4		
34	Laminated ceramic capacitor	CP1-3	GRM219F11E105ZA01(1.0uF)	Murata	Mounted directly	3		
35	Laminated ceramic capacitor	CP4,5,8-14,20,25,	GRM219F11H104ZA01(0.1uF)	Murata	Mounted directly	20		
		CP27-31,C6-9						
Special note: (1) Blank columns denote the same content as the upper row. (2) If two or more part type names are written for one part, the upper row has priority. (3) The asterisk (*) in the item No. column denotes that the rest is blank.								
Special note:								



Item No.	Part Name		Part Specification			Required Q'ty per Unit	Supply Classification	Remarks
	Description	Part No.	Part Type Name (Drawing No.,Product Specification)	Manufacturer Name	Mounting Direction			
36	Laminated ceramic capacitor	CP6,7	GRM216F11H103ZA01(0.01uF)	Murata	Mounted directly	2		
37	Laminated ceramic capacitor	CP17,21,22,26	GRM219F11H104ZA01(0.1uF)	Murata	Not mounted	0		
38	Laminated ceramic capacitor	CP19,24	GRM2192P1H221JZ01(220pF)	Murata	Mounted directly	2		
39	Laminated ceramic capacitor	C1,2	GRM40CH300J50(30pF)	Murata	Not mounted	0		
40	Laminated ceramic capacitor	C3	GRM21BB11H473KA01(0.047uF)	Murata	Mounted directly	1		
41	Tantalum electrolytic capacitor	C4,5	F931D106MBA(10uF)	Nichicon	Not mounted	0		
42	Tantalum electrolytic capacitor	CP15,16	F931C476MCA(47uF)	Nichicon	Mounted directly	2		
43	Tantalum electrolytic capacitor	CP18,23	F931V225MBA(2.2uF)	Nichicon	Mounted directly	2		
44	Diode	D1,2	MA738	Matsushita	Not mounted	0		
45	5% resistor array (10 KΩ)	RA1	CND2B10 TBK103J(10KΩ)	KOA	Mounted directly	1		
46	5% resistor array (33 Ω)	RA2,3,11	CN2B4 TBK330J(33Ω)	KOA	Mounted directly	3		
47	5% resistor array (100 KΩ)	RA4,10	CN2B4 TBK104J(100KΩ)	KOA	Mounted directly	2		
48	5% resistor array (100 KΩ)	RA6-9	CND2B10 TBK104J(100KΩ)	KOA	Mounted directly	4		
49	5% resistor array (1 KΩ)	RA5	CND2B10 TBK102J(1KΩ)	KOA	Mounted directly	1		
50	5% resistor (1 KΩ)	R1,5,10	MCR10EZPJ102(1KΩ)	Rohm	Mounted directly	3		
51	5% resistor (1 MΩ)	R2	MCR10EZPJ105(1MΩ)	Rohm	Not mounted	0		
52	5% resistor (0 Ω)	R3,9,12,16	MCR10EZPJ000(0Ω)	Rohm	Mounted directly	4		
53	5% resistor (0 Ω)	R4	MCR10EZPJ000(0Ω)	Rohm	Not mounted	0		
54	5% resistor (2 KΩ)	R6	MCR10EZPJ202(2KΩ)	Rohm	Mounted directly	1		
Special note: (1) Blank columns denote the same content as the upper row. (2) If two or more part type names are written for one part, the upper row has priority. (3) The asterisk (*) in the item No. column denotes that the rest is blank.			Special note:					

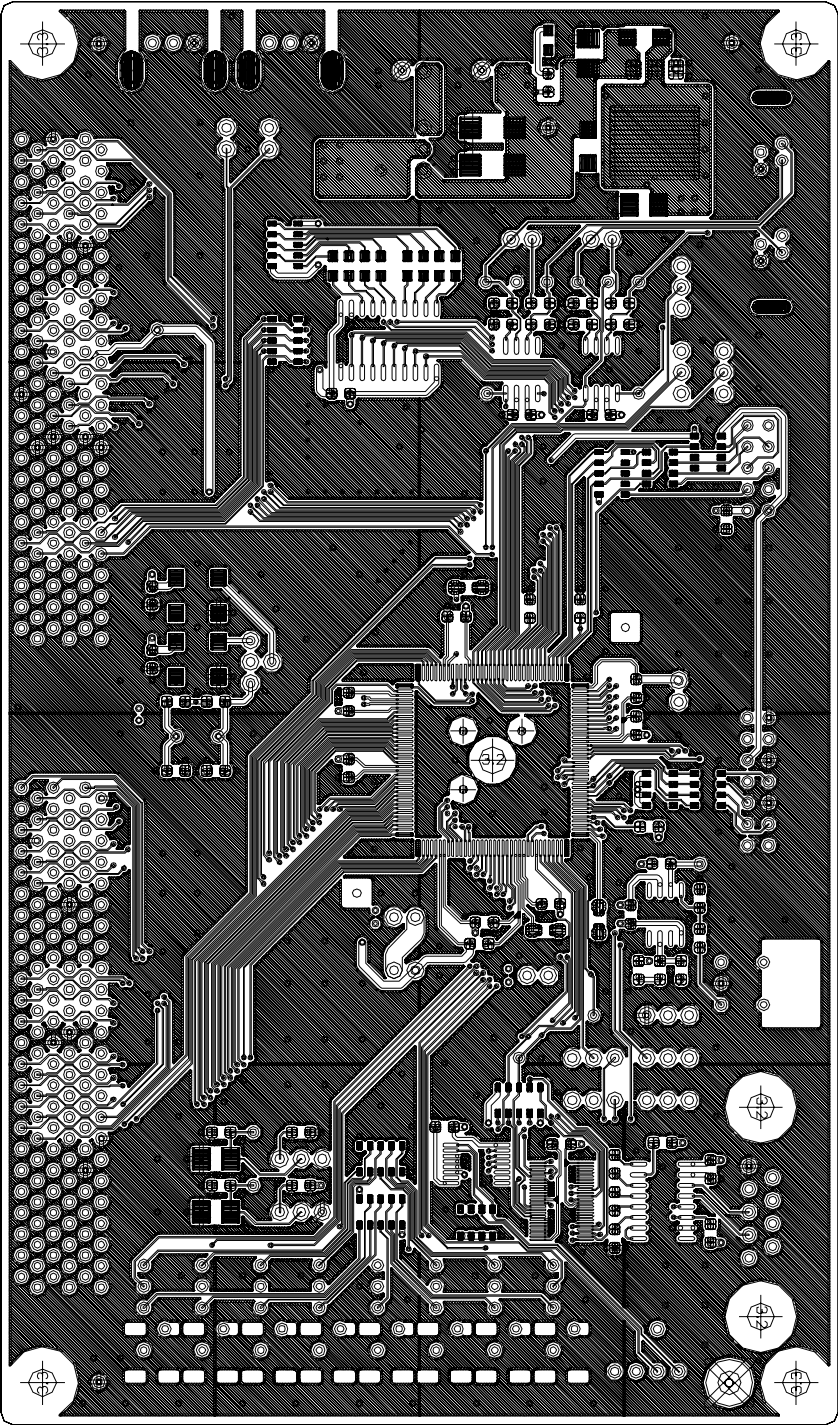
Item No.	Part Name		Part Specification			Required Q'ty per Unit	Supply Classification	Remarks
	Description	Part No.	Part Type Name (Drawing No., Product Specification)	Manufacturer Name	Mounting Direction			
55	1% resistor (10 KΩ)	R7,11,13,15,18	MCR10EZPF1002(10KΩ)	Rohm	Mounted directly	5		
56	5% resistor (22 KΩ)	R8	MCR10EZPJ223(22KΩ)	Rohm	Mounted directly	1		
57	5% resistor (120 Ω)	R14,17	MCR10EZPJ121(120Ω)	Rohm	Mounted directly	2		
58	Variable resistor	VOL0,1	RK09K1110B26 (right-angle type)	ALPS	Mounted directly	2		
59	J1 compatible jumper socket	J1	JM-T2W-61B	JST	Mounted directly	1		
60	Jx compatible jumper socket	J9,11,14-20	DIC208	Honda Tsushin Kogyo	Mounted directly	9		
61	Rubber feet		TM-166-3 (black color)	TOCHIGIYA	-	5		
62	Board		M3A-2154G02A/G12A (DK30550)	(SHT)	-	1		
63	Power cable		HTD-A4H0043	(SHT)	-	1		Included as part
64	CAN cable		HTD-A4H0044	(SHT)	-	2		Included as part
*								
Special note:			Special note:					
(1) Blank columns denote the same content as the upper row.								
(2) If two or more part type names are written for one part, the upper row has priority.								
(3) The asterisk (*) in the item No. column denotes that the rest is blank.								

### 3.6 Pattern Diagram

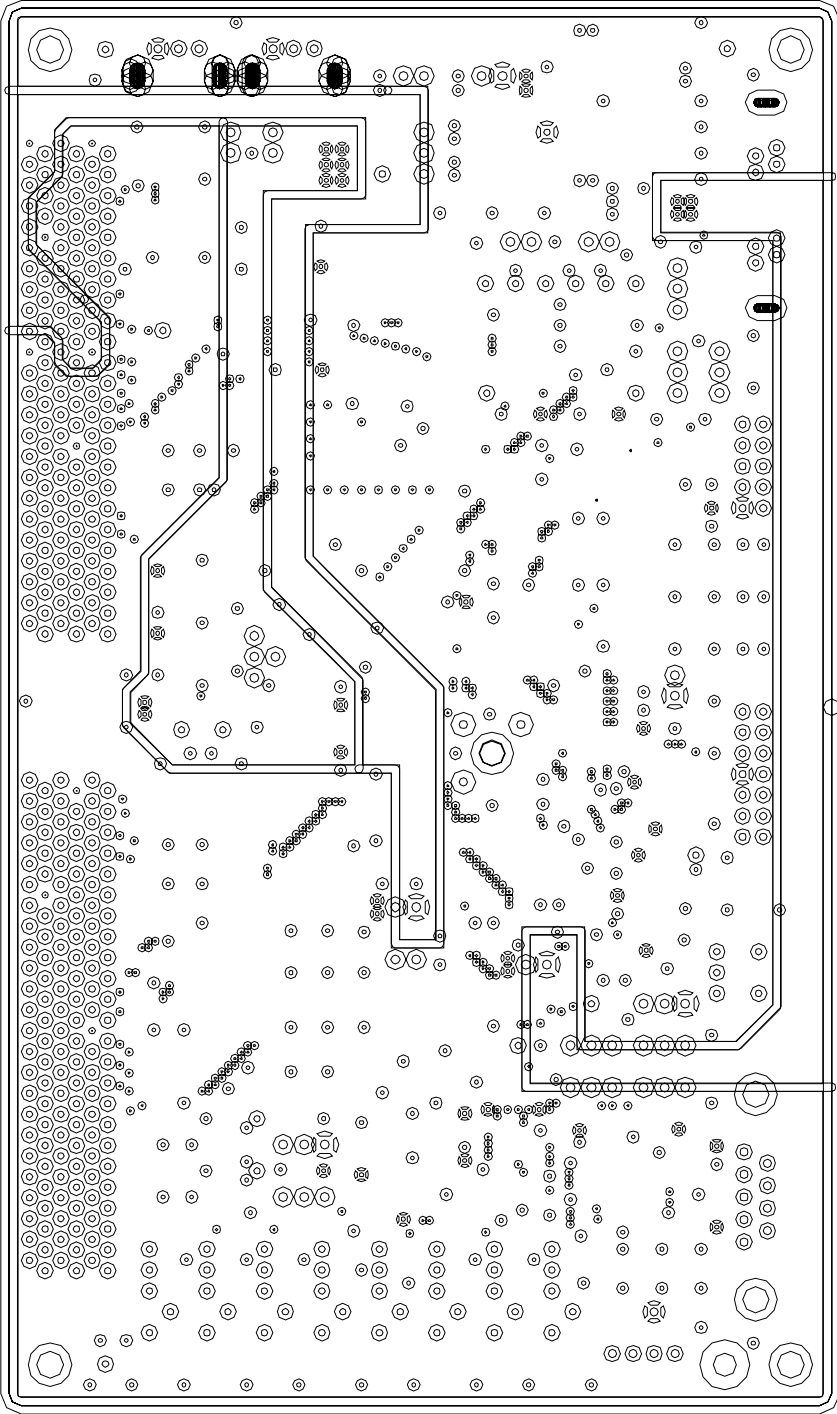
A pattern diagram for the board is provided in following pages for your reference.

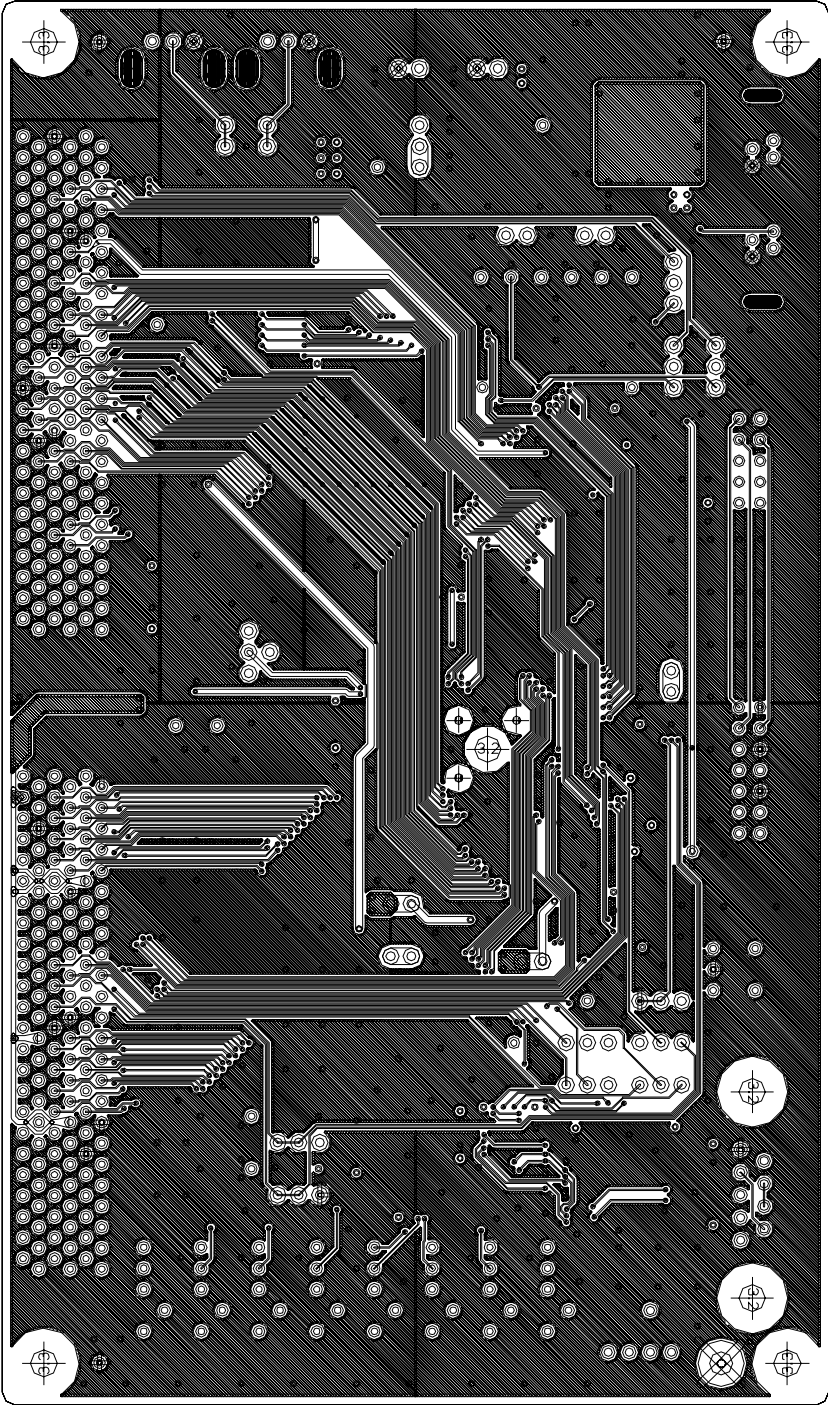
DRAWING No.		PG	DATE	DESCRIPTION		ITEM	MATERIAL NUMBER (MATERIAL)		VOLUME																				
<div><div><div><div>3RD ANGLE PROJECTION</div><div>DIM IN mm</div></div><div><div>SCALE / (NTS)</div><div>DATE 05-10-4</div></div></div><div><div>M3A-2154G02A</div><div>Pattern diagram(1/6)</div></div><div><div>DK30552</div></div></div> <tr><td colspan="10"><div><div><div>DRAWN</div><div>CHECKED</div><div>DESIGN</div><div>APPROVED</div></div></div></td></tr> <tr><td colspan="10">CHANGE</td></tr>										<div><div><div>DRAWN</div><div>CHECKED</div><div>DESIGN</div><div>APPROVED</div></div></div>										CHANGE									
<div><div><div>DRAWN</div><div>CHECKED</div><div>DESIGN</div><div>APPROVED</div></div></div>																													
CHANGE																													

Symbol - print - C

DRAWING No.		PG	DATE	ITEM		DESCRIPTION	MATERIAL NUMBER (MATERIAL)	VOLUME		
<div style="text-align: center;">  </div>										
<div style="text-align: center; font-size: 24px; font-weight: bold;">Pattern 1/4</div>						<div style="text-align: center;"> <div>3RD ANGLE PROJECTION</div> <div>DIM IN mm</div> </div>		<div style="text-align: center;"> <div>SCALE</div> <div>/ (NTS)</div> </div>	<div style="text-align: center;"> <div>DATE</div> <div>05-10-4</div> </div>	<div style="text-align: center;"> <div>M3A-2154G02A</div> <div>Pattern diagram (2/6)</div> </div>
						<div style="text-align: center;"> <div>DRAWN</div> <div>CHECKED</div> <div>DESIGN</div> <div>APPROVED</div> </div>	<div style="text-align: center;"> <div>DK30552</div> </div>			
						CHANGE				

## Pattern 2/4

DRAWING No.		PG	DATE	ITEM		DESCRIPTION	MATERIAL NUMBER (MATERIAL)	VOLUME
								
Pattern 3/4								
CHANGE		3RD ANGLE PROJECTION		DIM IN mm	SCALE / (NTS)	DATE	M3A-2154G02A	
						05-10-4	Pattern diagram (4/6)	
		DRAWN		CHECKED	DESIGN	APPROVED	DK30552	

DRAWING No.		PG	DATE	ITEM		DESCRIPTION	MATERIAL NUMBER (MATERIAL)	VOLUME
<div style="text-align: center;">  </div>								
<div style="text-align: center;"> <h2>Pattern 4/4</h2> </div>								
CHANGE		3RD ANGLE PROJECTION		DIM IN mm	SCALE / (NTS)	DATE	M3A-2154G02A	
						05-10-4	Pattern diagram (5/6)	
		DRAWN	CHECKED	DESIGN	APPROVED	DK30552		



[illegible]

### 3.7 Diagram of External Dimension

A diagram of external dimension for the board is provided in following pages for your reference.



## 3.8 Setting Jumper by Cutting Pattern

Some jumpers are shorted at default condition by pattern wiring on the reverse side of printed circuit board. Case of setting the condition except for default, the following setting is required.

Note: Case that the printed circuit board is cut pattern by user, the product is except from repairable list.

### 3.8.1 Cutting Pattern

The pattern wiring for default condition of jumper is on the reverse side of printed circuit board. After checking the position of the jumper, cut the pattern wiring between through-holes

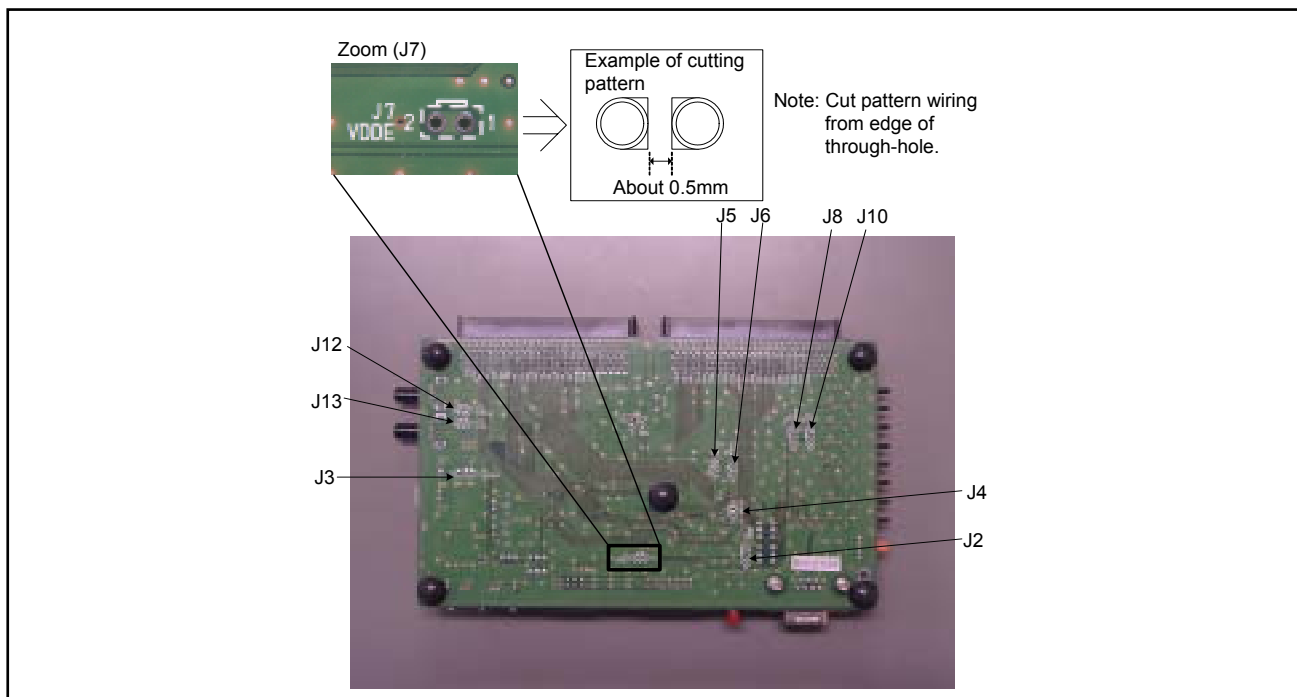


Figure 3.4 Example of Cutting Pattern

Table 3.6 List of Jumper

Jumper No.	Description	Jumper No.	Description
J2	Sets MOD1 to 0	J7	Power supply from VCCE
J3	Power supply from VCCE	J8	Controls MOD0 by EXTMOD0, unless control MOD0 by EXTMOD0 sets MOD0 to 0
J4	Power supply from VCCE	J10	Enables reprogramming the mounted M32R/ECU's internal flash
J5	Power supply from VCCE	J12	Uses the VR control (VOL0)
J6	Power supply from AVCC0	J13	Uses the VR control (VOL1)

### 3.8.2 Jumper Shorting

The jumper is shorted according to the condition.

The example of using jumper pin is shown below.



Figure 3.5 Example of Using Jumper Pin

### 3.9 Description of Board Silk

The color of board silk indicates solder specification when the items on board are mounted.

Table 3.7 Difference in the Color of Board Silk

Color of board silk	Solder specification when the items on board are mounted
White	Using nonlead-free soldering
Yellow	Using lead-free soldering

REVISION HISTORY	32185/32186/32192/32195/32196 Group Starter Kit User's Manual M3A-2154G52B
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Rev.	Date	Description	
		Page	Summary
1.00	Oct. 10, 2004	—	First edition
1.30	Oct. 16, 2006	—	<ul style="list-style-type: none"> <li>- Added the board M3A-2154G02A product (Appendix 3)</li> <li>- Added the 32185 Group and the 32195 Group to the starter kit applicable microcomputer</li> <li>- Updated a setup method along with the tool update (Chapter 6)</li> <li>- Updated contents of CD-ROM (Appendix 1)</li> <li>- Updated a diagram of the external dimension. (Appendix 3.3.7)</li> </ul>
1.40	Jan. 19, 2007	—	<ul style="list-style-type: none"> <li>Updated contents of the evaluation board of M3A-2152G52A User's Manual</li> <li>- Updated an external view and a block diagram (1. Overview)</li> <li>- Added description of board silk (3.9 Description of Board Silk)</li> </ul>

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**32185/32186/32192/32195/32196 Group**  
**Starter Kit User's Manual**  
**M3A-2154G52B**

Publication Date: 1st Edition, Dec. 27, 2005  
Rev.1.40, Jan. 19, 2007

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